



# Study Path Guide

– Tips to teaching in the various phases of studies

Eeva Myller (ed.)



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**–Tips to teaching in the various phases of  
studies**

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Edited by Eeva Myller

Layout by Tmi Kati Rosenberg

Illustrated by Esa Holopainen

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## Foreword

OTE is a project related to developing teaching and supporting studies in the field of technology. The purpose of the project is to make study paths fluent through developing teaching and student counselling at the various stages of a study path. The cooperation network consists of five universities and five universities of applied sciences. The activities were coordinated by Aalto University Professional Development. The other partners are Lappeenranta University of Technology, Helsinki Metropolia University of Applied Sciences, Oulu University of Applied Sciences, University of Oulu, Saimaa University of Applied Sciences, Tampere University of Applied Sciences, Tampere University of Technology, Turku University of Applied Sciences and University of Vaasa. The project was funded by the European Social Fund and the North Ostrobothnia Centre for Economic Development, Transport and the Environment, and it was implemented between 2008 and 2011.

We wanted to make the results of the OTE project available to everyone interested in fluent study paths. Therefore, a decision was made to gather them into a single book. A publication working group supported the task by guiding the design of the publication, gathering material, and participating in the writing work. A warm thank you to the members of the working group: *Janne Ahtinen, Kimmo Kyttä, Pasi Lankinen, Katja Laurinolli, Heidi Passila, Petra Rutanen, Sirpa Saari and Riitta Varis*. Thanks also to everyone involved in the article-writing work and development of the study path game.

Under the project dozens of teachers, advisors and planning officers have developed teaching as well as support services related to learning. Hundreds of people have participated in training events, workshops and seminars. It is encouraging to see how many teachers value good quality of teaching and are willing to use their time to develop it. We hope that this guidebook works as encouragement to continue this valuable work, also inspiring new teachers to engage in teaching experiments.

In Espoo, 15 June 2011

*Eeva Myller*  
Chairperson of the  
publication working group

*Outi Huvinen*  
Project manager





# Introduction

*Eeva Myller, Aalto University*

A fluent study path benefits both the student and the university. *‘Study Path Guide – Tips to teaching in the various phases of studies’* is a collection of good practices developed during the OTE project. The guidebook has been divided into five chapters in accordance with the study path: To support the trek, At the beginning of a study path, Individual paths, Along the study path, and At the end of the study path. Finally, we will play a round of the Study Path Game.

The guidebook is meant for teachers and advisors to support their work as the students’ guide on the study path. It also provides inspiration to teaching developers.

University studies necessitate mastering study skills different from those at the preceding school levels. Studying is much more independent and theoretical. A university may affect the fluency of studies by supporting the development of study skills. Skills learned at the very beginning of studies accelerate the studies and benefit the student throughout the study path. Study skills may also be learned through trial and error, but this causes loss of time and unnecessary delay in studies. The chapter **To support the trek** concentrates on study skills that are significant in ensuring a fluent study path.

In this chapter, two approaches to teaching study skills to students are presented. Based on the articles, study skills can be taught either as integrated to a study module or on a separate study skill course. How can study skills be taught? This is what *Johanna Naukkarinen* discusses in her article, which opens the chapter. The article provides tips that teachers have found useful when teaching study skills as integrated into their own teaching. *Janne Ahtinen*, on his part, presents a separate study technique course arranged at the Turku University of Applied Sciences. The course is geared to students struggling with the challenges of early-stage studies. The article describes exercises that were used on the course and easy to use in developing study skills.

In addition to teaching, students can be guided to develop their own study skills. *Jori Leskelä* presents a study skill portfolio that was developed at the Tampere University of Applied Sciences and provides students with comprehensive information on study skills and accessible studying. A student may assess his/her own study skills through self-assessments and as part of teacher tutoring. *Petra Rutanen* illustrates the benefits of students' time management guidance. Students who participated in time management monitoring at the University of Oulu graduated faster than the people in the control group. Time management planning and guidance are thus effective means of improving study advancement.

Fluency at the early stage of a study path predicts study advancement at later stages. The chapter **At the beginning of a study path** lists actions that can be used to help get studies to a good start. *Aimo Rahkonen* reminds us of how important it is to recognise the problematic issues at the beginning of studies. In order to attain results, it is often enough to focus development measures on one or two critical courses that slow down study advancement. In addition to recognising the bottlenecks of studies, it is also important to support students' attachment to studies and the new learning environment. At the early stages of studies, an important form of guidance is teacher tutoring, which helps promote students' integration as part of the university community. *Janne Ahtinen* describes the new teacher tutoring model adopted at the Turku University of Applied Sciences, based on smaller groups than before and more frequent meetings. For her part, *Ulla Forsström* presents successful teacher tutoring practices applied at Metropolia.

During the first years of studying, mathematics forms a great part of studies in the technical field. Supporting mathematics learning is therefore an effective way of making early-stage studies fluent. *Meri Kailanto* has prepared a student's guide to studying mathematics. Teachers can hand it out to their students. They can also assess the usefulness of the tips in studying their own subject. *Jussi Kangas'* article provides an introduction to the Mathematics Clinic at the Tampere University of Technology. In the Mathematics Clinic, students solve math problems in small groups and receive advice from the advisor if needed. The results are rather promising: both

study success and motivation for learning mathematics improved among the participants. Mathematics teaching has also been developed at Aalto University where peer review and presentation walks were tried on courses. More information on the experiments is provided in the article by *Pekka Alestalo, Harri Hakula, Linda Havola, Helle Majander, Antti Rasila and Jarno Talponen*.

Each student will have his/her own distinctive study path. Finding the right subject combination, hobbies, exchange studies and starting a family are all part of a young person's life. The number of adult students who go to work at the same time is increased by the need to update one's competence. The students' various life circumstances increase the need for varying ways to complete their studies. The chapter **Individual paths** provides information on flexible studies and the world of diverse learners.

*Heidi Passila and Kari Manninen* present flexible study completion methods that aim to reduce the time to graduation and make working careers longer. The presented methods – such as distance thesis instruction and online lecture transmission – help those in particular who do not reside in the municipality where the teaching is provided. Practical tips on arranging distance teaching are provided by *Anne Salmela and Harri Eskelinen*. They demonstrate using an online conference system in the presentation of seminar papers. Studying can also be made more flexible with an exam aquarium, which allows a student to fit an exam into his/her own schedules. *Anne Salmela's* and *Heidi Passila's* article sheds light on the flexible examination option offered at the Lappeenranta and Tampere Universities of Technology.

Learning disabilities may unnecessarily slow down a student's studies. However, universities can significantly impact the possibilities of diverse learners to participate in teaching. *Sirpa Saari's* article offers clear instructions on how a teacher can take a student with dyslexia or Asperger's syndrome into account in his/her teaching. Small measures, such as delivering lecture materials in advance and preparing summaries of what has been learned, are enough to support the learning.

The **Along the study path** chapter discusses the planning and assessment of teaching. One of the fundamental themes is the

cooperation carried out among both teachers and students. It is good to keep in mind that each teacher affects the fluency of a study path. However, no one needs to answer for the fluency of a study path alone. In fact, *Pasi Lankinen* reminds teachers about the importance of mutual cooperation. Cooperation is needed in, for example, defining the learning outcomes for an entire degree. The weekly team meetings held in Metropolia's Media Engineering Degree Programme represent an example of communal expertise and sharing competence.

What will I be when I grow up, what skills will I have when I graduate, which major and minor subjects should I select? These are questions that every student ponders. Well-defined learning outcomes make it clearer to a student what s/he should learn during degree studies. Learning outcomes form a map that enables a student to choose his/her own path. *Suvi Jutila*, *Aimo Rahkonen* and *Petra Rutanen* analyse the benefits of learning outcomes also from the point of view of a teacher as well as that of the university management and interest groups. They also provide instructions on how to assess learning outcomes.

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Study method selection may also support study advancement. At the same time, students learn other skills. *Kimmo Kyttä* and *Janne Koljonen* introduce us to the co-operative learning and continuous assessment applied at the University of Vaasa. With co-operative learning, the students' individual responsibility and mutual dependency are essential issues. As a working method that resembles working life, it also develops students' preparedness for working life. Continuous assessment – one example of which is micro exams – is an effective way to guide students' time management and promote learning. It is well-suited for application together with co-operative learning.

What is an adequate amount of instruction at the thesis stage? This is a question debated in the **At the end of the study path** chapter, in which practices for developing a supervisor's instructional skills and the thesis instruction process are presented. Thesis instructors can take the test prepared by *Heidi Passila* to find out what kind of instruction they are giving – but do not take it too seriously! *Katja Laurinolli* in turn presents tasks that advisors can use to share their experiences and distribute useful instruction practices. In the last

article, *Pasi Lankinen* describes the development work on thesis instruction introduced at Metropolia. The work has been inspired by the '*Jaa ohjausta, vai?*' (= 'Sharing instructions') publication prepared in the OTE project. The publication describes the practices of thesis instruction at the universities and universities of applied sciences of the technical field.

The guidebook ends with a study path game that aims to help solve questions related to study path fluency, by offering solutions in the form of metaphors. The game is at its best as a discussion opener and as a tool for brainstorming, and can be used, e.g. as a game to be played on a development day. The new practices of teaching and instruction should be tried out with an open mind, as every teacher's input affects the fluency of an entire study path.

Cooperation creates resources for development, and the study path game also encourages cooperation through the following metaphor: *Supervisors' collegial support to each other is like **snow***. And just like first snow, it makes you happy and brightens up the scenery. It inspires cooperation. You can build a snowman by yourself, but together we can build the world's greatest snow castle!



## Vocabulary

<b>Accessibility</b>	Accessibility refers to the implementation of physical and social environments in a manner that enables everyone to operate equally, regardless of their characteristics
<b>ACP</b>	Adobe Connect Pro software for organising web meetings.
<b>Active learning</b>	A teaching method that aims to make learning active by applying various methods.
<b>Blackboard, Moodle</b>	An online learning environment.
<b>Bottleneck (course)</b>	A course that many students fail. Often a part of first-year studies. Forms an obstacle to study advancement or graduation.
<b>Collaborative learning</b>	A study model that combines individual responsibility, direct interaction, equal involvement and positive overall dependency.
<b>Constructive alignment</b>	Teaching is constructively aligned when the selected teaching and assessment methods support the attainment of the learning outcomes.
<b>Continuous assessment</b>	A study assessment model in which a student gets both points and feedback on study performances in short intervals during a course.
<b>Curriculum</b>	A description of all studies included in a degree.
<b>Diverse learners/ various learners</b>	A term that describes learners with special learning disabilities. The term 'various learners' is perceived as being more extensive and inclusive of various learning styles.

<b>Exam aquarium</b>	A supervised room in which a student takes an exam on a computer at his/her preferred time.
<b>Flexibility/ flexible studies</b>	A need to complete studies in varying manners, such as distance learning, due to a situation in life, for example.
<b>Languaging</b>	The expression of mathematical thinking by using natural language (in writing or orally).
<b>Learning disability</b>	A disability that impedes learning through conventional methods. For example, dyslexia.
<b>Learning outcome</b>	A brief description of intended learning outcomes from a student's point of view; describes what a student is expected to know at the end of a course or module in order to pass it.
<b>Learning style</b>	Every one of us has a unique learning style. Some of us learn by listening, others by drawing/experimenting, and others by reading.
<b>PBL</b>	Problem-based learning.
<b>Peer assessment</b>	An assessment technique in which the assessor of learning or an output is on an equal level with the assessee. For example, students may mark each other's work.
<b>Presentation walk</b>	A way to present output from group work. Students are divided into groups and create posters, for example. At the presentation stage, the students are regrouped so that each new group has at least one member of each previous group. The output is discussed one group at a time, and a member from the implementing group presents their own work to others.
<b>PSP</b>	Personal study plan.
<b>RPL</b>	Recognition and acknowledgement of prior learning.
<b>Study path</b>	A continuum formed by university studies which divides into stages: it begins with applying as a student and ends with graduation and employment.
<b>Study skills</b>	Personal skills that enable learning new things. These may include various study techniques, such as mind maps, underlining techniques and summaries, etc. Study skills may also be seen to include time management skills and other equivalent skills that promote learning.



**Instruction agreement**

In a instruction agreement (for theses in the technical field), clear definitions are provided of the roles of the author, instructor and supervisor, as well as the goals and significance of the thesis for the project/company for which it is created. The agreement also aims to prevent any delays or interruptions in the thesis writing schedule, due to unclear goals.

**Teacher tutor**

A person belonging to the teaching staff who provides guidance for, e.g. the studies of first-year students.

**Thesis**

In the technical field, a thesis is to be completed at the end of a Bachelor of Engineering degree at a university of applied sciences or a Master of Science in Technology at a university. In other degrees of higher education, the equivalent thesis is referred to as 'pro gradu' in the Finnish system. A Bachelor's thesis refers to the diploma work completed after the lower degree level at an institution of higher education in Finland.

**Time management follow-up**

Students can be instructed to improve their own time management through follow-up measures.

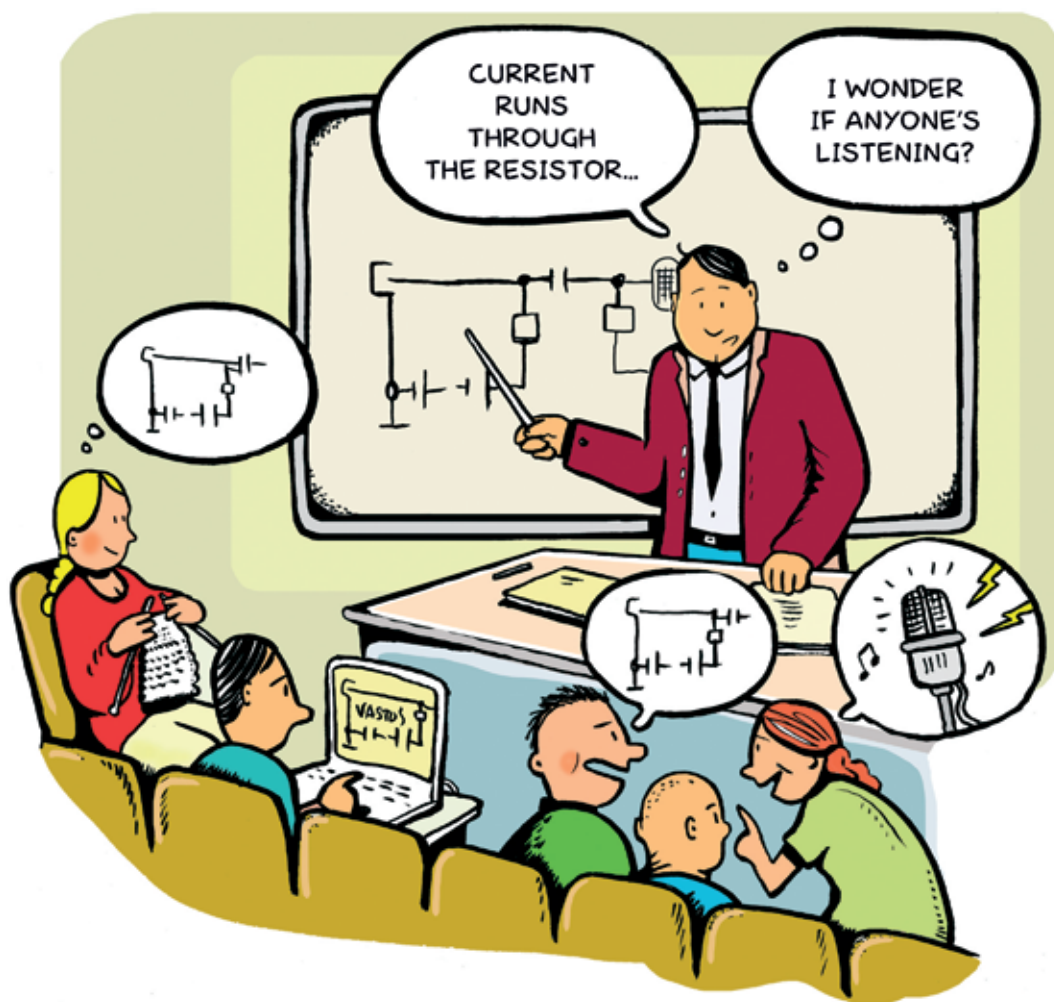


## Orientation guide to the reader

University teachers grapple with a variety of issues. The purpose of this section is to facilitate using this publication by listing various kinds of typical problems and arguments, and guiding the reader to solutions and further information.

	Chapters
Students are not putting in any effort until the last evening.	1, 4.4
Why is it important to invest in early-stage studies – isn't there always time later?	2
We should get working students and those living outside the municipality to graduate.	3.1–3.3
Asperger's syndrome, dyslexia – what are learning disabilities?	3.4
Results from team work	4.1, 4.3
What is a good intended learning outcome? What is the use of formulating them?	4.2
What is an adequate amount of instruction at the thesis stage?	5





# 1 To support the trek

## 1.1 Study skill development can be supported!

*Johanna Naukkarinen*, Tampere University of Technology

A lack of motivation and insufficient study skills can slow down university studies in the field of technology. According to the experiences of first-year students, time management problems are the second worst factor causing delays in studies. [1] . Also, nearly 60% of third-year students feel that difficulties with time management have slowed down their study advancement. Over a third of them also consider a lack of study skills to be one factor that has delayed study advancement. [2]

The significance of the aforementioned issues has been emphasized in the past few years, both in studying and working life. Working life renews itself at an intense pace, and on an average, the work tasks of academically educated professionals in the technical field change every three years [3]. Mastering transferable skills lays the foundation for competence development and work satisfaction. Similarly, studies show that self-regulation skills, which are part of transferable skills, are linked to study advancement [4].

There is no unambiguous definition available for study skills. The OTE project workshops on study skills indicated that teachers have highly varying perceptions of both study skills and the means to support them. During the workshops, the following analysis was formed as a tool for discussing study skills.

Study skills include:

- **Time and project management skills:** time and project management skills, coordination and organisation skills, the ability to plan one's tasks ahead, systematic problem-solving skills
- **Communication and presentation skills:** group work skills, negotiation skills, communication skills, performance skills, teaching, training and instructional skills
- **Research and information acquisition skills:** information retrieval skills, reading technique, note-taking techniques, competence in critical information assessment
- **Skills in logical thinking and expression:** skills in analytical and systematic thinking, logical self-expression in writing
- **Self-reflection skills:** the ability to assess and develop one's actions, the ability to find motivation, persistence

### Teachers supporting study skill development

In the OTE project, a total of nine workshops was organised between 2010 and 2011 that dealt with study skill development in teaching. In the various workshops, the topic was approached with slightly different emphases and methods. Teaching was approached as widely as possible, from the viewpoints of the learning environment, curriculum design, lecture-type teaching, assessment and instructional communication. Due to the desires expressed by the participants, special attention was paid to how students' motivation forms and how it can be built. The goals and structure of the motivation & study skills workshop are presented on the following page.

## **The motivation and study skills of university students – a workshop for teachers**

After the workshop, a participant will know how to:

- perceive connections between the motivation to study, study advancement and study skills
- analyse problems related to the motivation to study and challenges related to study skill development
- plan his/her teaching so that it includes elements that boost the students' motivation to study and improve the study skills.

The structure of the workshop:

1. Opening, tuning in, introductions
2. Introduction: Theory of motivation & results from the motivation report [4]
3. Exercise in pairs: an analysis of the possible causes of example students' motivational problems & measures for improving their motivation (appendix 1)
4. Introduction: Observations from working life and study skills [1, 2, 5]
5. Exercise in pairs: The "value watch analysis" of study skills & discussion on the significance of skills (appendix 2)
6. Group exercise: The hindrance/promotion of study skills through teaching, with the viewpoints of curriculum communication, lecture teaching, assessment and marking (appendix 3)
7. Ending, summary, feedback



In the workshops, it was noticed that as part of any course a teacher can through small measures help the students to develop their study skills. Here are some of the best tips from teachers to teachers:

### **How to support your students' motivation and study skill development**

1. Include the goals related to study skill development in the intended learning outcomes of the course.
2. Align your teaching constructively so that the selection of teaching and assessment methods supports the attainment of the learning outcomes.
3. Agree upon the rules for the course (what you expect from the students, what the students can expect from you) together with the students. If needed, also specify the learning outcomes together.
4. Use versatile teaching methods that activate students. Use various forms of group assignments and group work, and whilst applying them, familiarise the students with the phenomena and good practices related to group-based activities.
5. Demonstrate to the students how your course is part of a larger entity (a module, a major/minor, a degree).
6. Instruct the students on rational time management by explaining the planned course workload to them and by providing tips on how to plan time management. Avoid peaks with the workload.
7. Built assessment evenly for the duration of the course. Provide students with real-time feedback on their progress. Make use of self-assessment and peer assessment.



How can you support students' study skill development in your own teaching?

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## 1.2 'Find your own study technique' course

*Janne Ahtinen*, Turku University of Applied Sciences

In the Electronics and Information Technology Degree Programmes at the Turku University of Applied Sciences, a course led by the student counsellor has been organised related to study technique. The course is aimed mainly to first-year students who feel that they need further orientation during the early stage of their studies. Approximately 12 students can be accepted on the course in order to maintain a dialogic approach. The course consists of approximately 7 x 3 h meeting sessions, and the idea is to explore topics related to study skills needed within university studies by making use of students' own experiences. Study skills refer to learning, learning strategies, time management skills, career guidance, and the skills needed in life that a student must have in order to manage his/her studies.

The course can be organised in different ways. Visiting teachers or experts can be invited to the meetings, such as a mathematics teacher or a study psychologist. The implementation method should be activity-based, i.e. the students carry out and experiment on study skill-related exercises in class. On the other hand, it is important to bear in mind that the curriculum should not be defined too narrowly but rather allow students to lead sessions according to their own interests. Discussions will often arise that do not directly pertain to study skills but nonetheless support students in early-stage studies.

### Course benefits:

- Reaches students who may already be in danger of dropping out during the early stage of studies.
- A convenient way to have students get to know each other and the staff.
- Encourages students early in the studies.
- Provides tools for advancing one's studies.



### Student feedback four months after the course:

*"I've got to know my fellow students well, and the course also helped me to get to know students in a parallel class. I've found a few friends, which is quite enough to ensure fluent studying".*

*"I've developed my own study technique as I got inspired by the issues discussed in class. I am better aware of my weaknesses and strengths in studying. I will use this information to my advantage".*

*"Time management works so well that I'm able to complete assignments even before they're in a hurry".*

*"I got to know the people on the course and it's easy to be in touch with them".*

*"I took the course despite its late starting time, because the atmosphere was really laid-back, the learning environment fun and the subject extremely useful".*

Table 1. Key exercises done on the ‘Find your own study technique’ course

Exercise	What to do?	Why?
Coffee	Depending on the time of day (at 4 p.m.), it may be nice to start work by having a cup of coffee.	Something small to eat or drink is an easy way to lay a good foundation to a day's work.
Getting to know the group	Everyone interviews one of the participants, e.g. as follows: Who are you? Where are you from? What are you studying and why? What are your hobbies, etc.? After this, the interviewer introduces the interviewee to the rest of the group.	A nice and easy way to have the group members get to know each other. Especially well-suited for the first session.
Getting to know the group	The participants form a circle, throw a ball at random, and say the name of the person to whom they throw the ball. If the person does not catch the ball, the whole group does press-ups (building team spirit).	An activity-based method to get to know group members. Suits the first or second session.
Time management	Students form a timeline: those who feel that they do not have problems with time management go to one end, and those who feel that they do, go to the other. It is also possible to position oneself in the middle. Everyone then explains why they chose this particular position on the timeline.	An easy way to illustrate the issue and start a conversation. A central question: In my own opinion, how do I use my time?

Exercise	What to do?	Why?
Time management	Participants are divided into groups of three. Each group thinks of time thieves and writes them down on Post-its, for example. After that, the groups circulate over to the next group's place and supplement the answers. Finally, the rotation ends at the original position.	The group then mutually discusses what time is spent on and what the factors are that take up a lot of time during a day.
Study skills	The students form pairs and list what study skills are. The results are then mutually gathered on a flip chart, for example.	A simple way to have the group start reflecting upon what study skills are and what issues relate to studying and the ability to study.
Learning	Students contemplate: how have I learned to do something, e.g. to swim, cycle, etc.? What happened in that learning process? Replies are gathered on, e.g., a flip board.	Students piece together what happens when they learn.
Basic study skills	Students are divided into four groups, and each studies one of the study techniques: 1) Mind map 2) Box technique 3) Picking technique 4) Cheat sheet After this, four new groups are formed, each containing a representative of each technique. This way, everyone will hear the idea behind each technique.	The study techniques are discussed. What are they and how do they suit me in particular?

### Career guidance

A job interview exercise: the students prepare interview questions in groups of 3–4 and follow the interviews through. When preparing questions, it is good to use job advertisements related to the field.

Job interview demonstration. At the same time, it becomes clear what the requirements are in the positions of this field. What should I learn during studies.



Why is it useful to teach study skills?

How is study skill teaching manifested in your teaching?

## 1.3 Learning skill folder – promoting study skills and accessible studying

Jori Leskelä, Tampere University of Applied Sciences

Student counselling is at an advanced level at the Tampere University of Applied Sciences (TAMK), and investments have been made in preventing and analysing the causes of interruptions of studies for years. Information and support is also provided to students suffering from learning disabilities.

With this firm foundation, further development steps have been taken through the OTE project. Coordinated by The School of Vocational Teacher Education at Tampere University of Applied Sciences, a **learning skill folder** software has been created in the TAMK intranet that aims to provide information on effective studying and help students examine themselves as learners. In addition to learning skill materials, the software provides reports containing a description of what kind of a learner one is. Students

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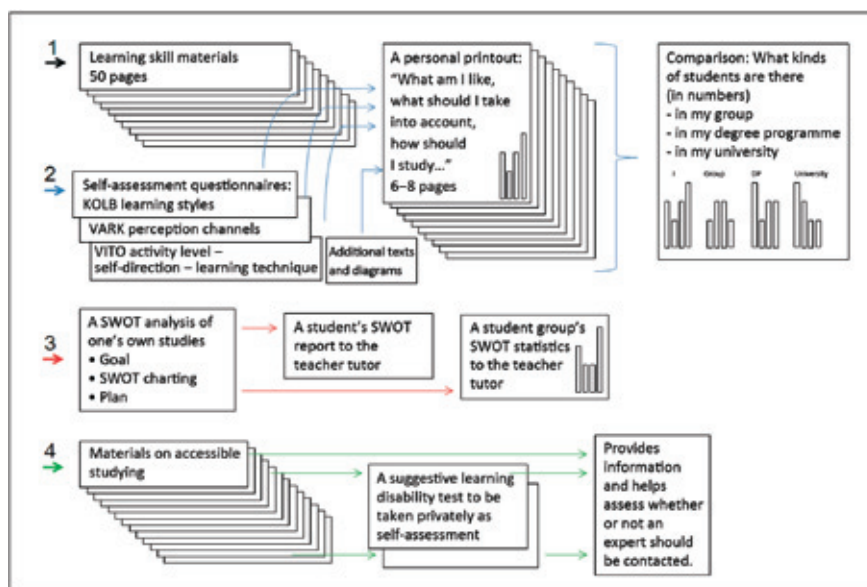


Diagram 1: The structure of the 'learning skill folder' programme and a student's paths for advancing in the programme



get recommendations and links to support materials so that they can increase their self-knowledge as learners and make their studying more effective. Diagram 1 describes the structure of the learning skill folder.

When proceeding on path 1 (see diagram 1), a student gets to explore versatile materials related to learning skills. The materials discuss the impacts of activity level, circumstances and attentiveness on studying, various learning styles, learning strategies, self-direction, skilful learning, group-based studying, electronic learning platforms, social media, time management, and various learning techniques. The materials shed light on reading techniques, note-taking techniques, learning by writing and writing methods, effective lecture attendance, memorisation techniques, recapitulation and preparing for exams.

If a student so desires, s/he can also begin by proceeding on path 2, which is perhaps more interesting. In this case, s/he will answer three self-assessment questionnaires, after which the software picks the descriptions and recommendations that suit this student in particular.

If so desired, the student can take the self-assessment tests once a semester to see if s/he has changed and/or developed learning skills in comparison to the previous results, according to the interpretation of the software.

To a certain extent, a student can also use the software to compare him/herself with fellow students. S/he may review if and how many similar students there are in the same study group. Students are not able to see any information on other individual students, but will instead see average results on learning styles and self-direction in his/her own study group, degree programme, and the entire university. Also, if a student is willing to study in a self-directed study group, for example, s/he is able to see if there are also others who are willing to invest in studying this way.

At the beginning of studies, teacher tutors instruct students to proceed on path 3 (diagram 1). The students prepare a SWOT analysis on their own studies. They set goals for their studies and reflect upon the kinds of strengths, weaknesses and challenges

they have in terms of attaining their goals. After this, they prepare a plan that takes these strengths, weaknesses and challenges into account. Teacher tutors get to see the reports of the students in their own groups. Another feature that has been found useful is that the teacher tutor is able to receive statistical information on the SWOT analyses. This allows the teacher to invite students in a similar situation to discuss their future studies as a group.

The responses and reports of an individual student will not be available for viewing to anyone else. The teacher tutor will only see a student's SWOT analysis report.

On path 4 (diagram 1), a student can familiarise him/herself with accessible studying at TAMK and get to know common learning disabilities and study-related problems. The material contains information on TAMK's degree regulations, accessibility plan, use of support vouchers <sup>1</sup> and exemption from language skill requirements. It contains information on who needs special support. It also contains information on the most common learning disabilities (e.g. dyslexia, perceptive disabilities and mathematics learning disabilities), mental problems (depression, anxieties, psychotic problems, eating disorders, substance abuse), Asperger's syndrome as well as adult ADHD and ADD. It also contains information for physically disabled students, weak-sighted and blind students, hearing-impaired and deaf students, as well as information on how to obtain aid devices for studying.

Links have been added to the material so that a student can choose to take certain learning disability tests openly available online and to receive suggestive information on a possible learning disability. This way, it is possible for a student to receive information and think about whether or not to turn to an expert to examine the issue in more detail.

<sup>1</sup> Support vouchers can be used to obtain special arrangements that support study advancement. Such special arrangements can include extra teaching or guidance, more time to take an exam, individual course completion methods or schedules, various learning channels or methods. It is possible to get up to 20 hours of special arrangements per academic year.

The learning skill folder will be taken into pilot use in TAMK in April 2011 and gradually into wider use in the autumn term 2011. During this time period, the aim is to fine-tune both the practices and the software so that all TAMK students, both in Finnish and English degree programmes, will be able to adopt the service from the beginning of 2012 onwards.

### **Benefits and viewpoints related to learning skill folders:**

- The existence of the material is a university's way of letting students know that study skills, learning styles and strategies, as well as reflecting upon them, do matter.
- Exploring the material is voluntary, and the responsible for study skill development lies with the student.
- The aim has been to make the exploration as interesting as possible through personalisation.
- The material includes learning-related issues on a wide scale. In order to prevent the material from exhausting and boring a student, s/he will receive a summary text tailored for him/her personally.
- With self-assessment tests, a student can add his/her self-knowledge and follow up on attained study skill development as studies advance.

The structure of the software has been designed with the aim of expanding this student-oriented service into an even larger entity, i.e. a study briefcase, after the project. This would allow, e.g. creating an entity that would provide the teachers, heads of degree programmes, student counsellors and university management with various opportunities to get to know student groups from the point of view of their "learning profiles", and to analyse student groups by examining various correlations and dependencies. For example, statistical analyses of a management portfolio could help university

management identify bottlenecks and issues that require special attention in order for studies to advance. Another suggestion has also involved linking the motivation and follow-up questionnaires applied in TAMK as well as the health nurse's questionnaire to the learning skill folder to form a combined entity. Career guidance and working life skills also form a possible area for expansion that has come up in discussions.



Should learning skills be developed separately – with a specific teacher assuming responsibility for it – or integrated into courses – with all teachers involved?

How do you take diverse learners into account?

## 1.4 Instructing a student's time management

*Petra Rutanen*, University of Oulu

In order to succeed in studies, it is essential for a student to manage his/her time sufficiently and effectively. The form of a course may affect a student's time management through the workload, schedules, assessment methods and learning outcomes. A teacher can support and motivate a student by instructing him/her in self-contained time management planning.

According to a study carried out at the University of Oulu, adding student guidance is beneficial both in terms of time management and study technique. Effective studying and successful time management reduce stress and produce better learning results. Studies have also shown that first-year students benefit the most from time management follow-up. [1, 2, 4]

### **Even study workload decreases stress peaks**

A student's workload and true learning take a certain time. The time required by studies as well as the amount and difficulty level of study substance form the overall study burden. If, for example, there seems to be too little time to study for an exam and if most of the studying takes place right before an exam, a student may find the situation overburdening. If a student feels overburdened, it is likely to lead to superficial learning and trying to pass an exam by memorising a minimum number of issues by heart. [3]

Distributing studies evenly for the duration of a week will prevent overburdening. By following up on their time management, students are able to see what their time is spent on and also identify problematic factors and deficiencies. Time management also involves combining studies, work and leisure. Even with 4–5-week follow-up, a student may notice a connection between the actual time spent on studies and learning results. [1, 2]

Students should especially receive guidance in time management at the early stages of studies, as it may be difficult to adapt to studying at a university. A student’s situation in life changes when s/he moves away from home and learns to take responsibility for both studies and him/herself. Digesting extensive topics requires learning new kinds of study strategies and the ability to divide the time spent on studies without anyone else’s direction. Time management learnt at the early stages of studies will also help later as studies advance.

**A positive risk of graduation!**

It is recommended to schedule the time management follow-up period to the spring term of the first year of studying, as the autumn term tends to be hectic, and the student will also have gathered more experience of university studies by the spring term. Time management can be carried out easily and inexpensively so that it does not take much time from the participants. It is an effective and easy way to instruct students, as research shows that time management follow-up has a positive effect on the “risk of graduating.” The progress rate at the early stages of study is very likely to predict the probability of graduating.

Table 1. Those who participate in time management follow-up have a significantly higher risk of graduating than the control group, regardless of the same setout level. This information is based on research on student time management in the Department of Electrical and Information Engineering at the University of Oulu between 2003 and 2004. [2, 5]

Comparison period: November 2009	The share of graduates, 2003 intake	The share of graduates, 2004 intake
Students participating in time management follow-up	15/48 = 31.3%	8/45 = 17.8%
Control group (the rest of the intake)	31/256 = 12.1%	2/202 = 1%

## Time management follow-up during the OTE project

In the spring of 2010, time management follow-up was carried out in the Department of Electrical and Information Engineering on first-year students, assisted by tutor teachers<sup>1</sup>. First, a session was organised for tutor teachers in which the follow-up and results of time management were presented to them. The teachers were instructed to hold a presentation on time management to their own small groups and to have those interested in time management participate in a five-week follow-up period. Tutor teachers instructed students to fill in the follow-up form on a daily basis and submit the results once a week. Every week, the weekly averages of each group were entered in the time management follow-up site of the department. After completing the entire five-week follow-up, students received a memory stick as a reward in connection with the final interview.

Table 2. Average study time by weeks. The overall time spent on studying as well as instructed studying (incl. lectures, exercises and exams) are indicated separately. The highest amounts of hours (44.2) were attained during the first week. On week 5, a change of study period and the beginning of Easter holiday decreased the average to 20.5 hours. [5]

Week 1		Week 2		Week 3		Week 4		Week 5	
Total	Instructed	Total	Instructed	Total	Instructed	Total	Instructed	Total	Instructed
44.2	24.3	39.7	18.1	32.9	19.9	34.6	19.9	20.5	13.2

There was variation in the students' studying amounts. The average studying amounts during the entire follow-up period varied between 17.6 and 63.8 hours depending on the week. 62% of the participants studied for over 30 hours a week, and 34% of the participants for over 40 hours a week.

<sup>1</sup> Tutor teachers are members of the department staff who aim to familiarise a new student with the department and studying there.

A common opinion among the comments requested after the time management follow-up was that the studies in the autumn and in the spring were unbalanced, and that the spring term was too stressful. Some of the students stated that they spend too little time on studying. A common remark was that they seem to forget about studies toward the end of the week and during the weekend, and that the load is greatest at the beginning and middle of a week. A reported goal was that independent studying in particular should be partly continued during the weekend in the future. [5]

### Enhance learning

- Describe the planned course workload, intended learning outcomes and course schedules in the study guide.
- Select assessment methods and criteria so that they support the intended learning outcomes.  
An assessment method will also strongly guide a student's time management, so it is important to implement it in a manner that spreads the workload evenly.
- Invest in students' time management guidance.  
It is useful to tell students about, e.g. the amounts of independent and instructed work as well as what is required of them in order to attain the intended learning outcomes of the course. Furthermore, a student must be made aware of his/her own time management and thus support their self-direction.
- Attached is an example of a student's time management follow-up sheet (Appendix 4).





How much time is spent on studying on your course?

Have you affected the students' "risk of graduating"?

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## 2 At the beginning of a study path

## 2.1 The significance of early-stage studies

*Aimo Rahkonen, University of Oulu*

The way that students link up with their new environment and studies is usually determined early in the studies. Several analyses have shown that the success of first-year studies especially affects graduation times and the prevention of interrupted studies. [1, 2, 3] It is easy to conclude that the factors affecting the first year of studies has great significance in terms of a student's graduation, and it therefore makes sense to invest in the identification of problems during the early stages of studies and to direct any supportive measures to the initial study years in particular.

What should special attention be given to at the early stage of studies? Which factors most commonly form obstacles to advancement during the early stage of studies? Possible signs of a bottleneck have included students' minor amount of time spent on studying, unevenly distributed workloads on courses and during studies, decreased share of passing marks, an increased circulation load or, simply, feedback from students or the development in average credits attained. The factors working in the background may be even more complex. Therefore, one must have tools for recognising the most critical problems when designing and implementing education. Furthermore, one must have the will and ability to work towards clearing them away in the best possible manner. In order to reliably assess the impacts of the measures, it is usually enough to direct the measures to one or two most critical bottlenecks at a time. Resolving even one critical defect and advancement obstacle may enable the attainment of improved results surprisingly effectively.

## **Observations about the significance of early-stage studies**

**(University of Oulu, Faculty of Technology, 2004)**

- Approximately 10% of graduates attained fewer than 40 credits during the first year of studies: the median among the graduates was 46 cr and the average exceeded 50 cr.
- The rate of study progress tends to migrate from the first year.
- Few are able to pick up after falling behind.
- Delayed studies usually delay graduation as they are only completed at the end of the studies.
- Falling behind and the risk of dropping out carry a distinct correlation.
- Furthermore, the dependency of next year's study grants on the credits received in the first year may complicate picking up the speed later if a student falls behind right at the beginning.
- The half-life of a retry with a first-year course is 4 years.

## **Conclusions**

Passing courses on the first time is especially important in order to prevent falling behind from the very beginning. The timeliness of studies and their rational placement in the curriculum and in timetables is a necessity for a fluent start to studying. Even a minor improvement in first-year study rates may significantly improve later study advancement and the likelihood of graduating. A rough rule of a thumb:  $n$  additional credits in the first year means  $5 \times n$  additional credits in 5 years.



What kind of practices do you apply in order to affect the fluency of early-stage studies?

Examples in the 'Tunnista, kehitä, arvioi' publication (in Finnish)  
[http://www.oulu.fi/oky/  
julkaisut\\_ja\\_materiaalit/  
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## 2.2 New power to teacher tutoring!

### Best practices in teacher tutoring

*Ulla Forsström*, Helsinki Metropolia University of Applied Sciences

In the academic year 2009–2010, a teacher tutoring development project was carried out in the Information Technology Degree Programme at the Espoo campus of Helsinki Metropolia University of Applied Sciences. The aim was to develop teacher tutoring for first-year students by experimenting on new practices. The following development targets formed the starting point: coordination, contents and implementation, and the competence of teacher tutors.

During the development project, the following workable teacher tutoring practices came up:

#### **Group meetings**

Group meetings, spread for the duration of the entire year in the timetable, are used as an implementation method for teacher tutoring. At the beginning of studies, students have been divided into teaching groups of approx. 20 people based on their schooling history. The teaching group is simultaneously also the tutor group. At a minimum, there is one group meeting per each period, i.e. four times in an academic year. The duration of a meeting equals two lessons. The meetings are led by teacher tutors who teach vocational subjects and the student counsellor of the degree programme.

The contents of the group meetings have been designed to support a student's PSP process. The contents include

- an activity-based introduction exercise or game, e.g. a line of feelings
- teacher tutoring: what, why, and how?
- personal study plan process, PSP
- selection of student representatives
- an engineer's profession, competence areas and work tasks, the teacher tutor's own career path in the technical field as an example
- general working life skills
- studies and courses offered, study practices
- feedback on studies and studying.

**Why?** Group meetings support students' studying and learning, well-being, creating a sense of belonging to a group, the development of social and feedback-provision skills as well as the feeling of being safe and cared for. An activity-based introduction exercise or game will promote the creation of a positive atmosphere for learning. Feedback on the studies enables collecting feedback during a course and implementing immediate development measures.

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Student feedback:

*"You get more information in group meetings and you remember things more easily because you can discuss them there with no hurry".*

*"Group meetings improve team spirit and help you deal with study-related issues together".*

*"A smaller group = easier to say something".*

*"The teacher tutor is laid-back, takes the issue seriously and listens to you".*

*"Sometimes I hear other people having similar problems, good to know you're not alone".*



## Student counsellor and teacher tutor as a work pair

The student counsellor participates in all student group meetings as a work pair to the teacher tutor.

**Why?** A work pair complements each other's guidance expertise and can therefore better respond to students' guidance needs. Students receive guidance of higher quality. The partners provide each other with support and peer feedback. This method promotes professional development and the creation of a dialogic learning culture.

## The PSP process integrated into teacher tutoring

A 'PSP' is defined as a personal study plan process that covers a student's entire study path. During a PSP process, a student assesses his/her competence, sets goals and follows up on their attainment, plans his/her studies, and reflects upon the purpose of studies. The PSP process is integrated into teacher tutoring as follows:

- The subjects of the group meetings include orientation to the PSP process, introductions to the curriculum and an engineer's profession and competence areas as well as reflecting upon the purpose of the studies.
- The students will prepare an electronic PSP. The contents of the PSP include assessments of one's own competence, strengths and development targets, the status of studies, a plan to complete delayed studies and a plan for future studies.
- The students have a one-on-one PSP discussion with their teacher tutor. The discussion involves going through the PSP, clarifying the current status of studies and future selections, and support provision in possible problems.

**Why?** The PSP process supports a student's professional growth, learning, and study advancement.

## Student representatives

Students select representatives among themselves. A student representative is an active and development-oriented student who is as a contact person for his/her own group and collects feedback. The teacher tutors and the student counsellor invite the student representatives to a “feedback lunch” 1–2 times an academic year.

**Why?** Student representative activities promote the cohesion of the group and the development of education as well as increases the students’ feeling of being able to affect issues.

## Teacher tutoring integrated into the curriculum

Teacher tutoring is a part of compulsory studies. In the first year, teacher tutoring is integrated into the Orientation Studies course. Teachers who teach vocational subjects act as the teacher tutors.

**Why?** When integrated into studies, teacher tutoring is not perceived as something unconnected or additional. Teacher tutoring is found more valuable, which supports commitment to the activities. The teachers of vocational subjects are better able to instruct students with issues related to the field, the curriculum and course selections than the teachers of general subjects.

## Expertise-based, centralised coordination

The student counsellor of the degree programme coordinates teacher tutoring and prepares a plan and the materials for teacher tutoring.

**Why?** A student counsellor’s competence combines expertise in student counselling, pedagogical competence and know-how related to the practices of the degree programme and university in question.

## **Collaborative and involvement-oriented development**

A student counsellor involves teacher tutors and students in the various stages of development: design, implementation, assessment and material preparation.

**Why?** “If you want commitment, get people involved!” The opportunity to affect issues relating to one’s own work supports a positive attitude, commitment, and well-being at work and with studies. Collaborative development supports mutual understanding and perceiving the experiences of the other party.

## 2.3 A small group-based tutoring model for first-year tutoring

*Janne Ahtinen*, Turku University of Applied Sciences

### Teacher tutoring in the past

In the Turku University of Applied Sciences, the first-year tutor meetings in the technical field have traditionally been organised in groups of dozens of students. Meetings have been held regularly but with intervals of a few weeks. Despite the one-on-one PSP discussions, it has not been possible for a teacher tutor to remember every student's information throughout the year and to connect everyone's names with their faces. A teacher tutor has not been able to create a natural contact with the students, which has increased a feeling of insecurity among the students and may have increased the number of students dropping out. In a way, teacher tutoring has been perceived as a separate part of everyday teaching both by the students and the teachers. The longed-for team spirit of the study group has rarely developed.

### A new kind of a tutoring model

The idea behind the small group-based tutoring model is that the size of a tutor group is approximately ten students. This way, the relationship between the teacher tutor and the student becomes more intensive and, simultaneously, the students start to group more naturally and more quickly.

The actual benefit of the small group-based tutoring model rests upon combining it with, e.g. PBL-type teaching or a practice business<sup>1</sup>. This allows the teacher tutor to operate with his/her small group almost on a daily basis, and guidance is provided in a natural way within normal study activities. Every teacher tutor can get to know each student, thus increasing students' feeling

<sup>1</sup> A 'practice business' represents a teaching method that involves studying business operations and related issues in small groups in a practical manner. Such issues include, e.g., start-up, accounting, financial statements, business plan, marketing and financing. The same issues can be taught through lectures, but with this method, the members of the practice business have to determine the same matters under the teacher's guidance.

of security. Absence control and dealing with problems becomes easier and more effective. As a result of small group tutoring, there are fewer students dropping out at the early stage of studies and, especially, during the first academic year.

### **The benefits of small groups in tutoring**

- A teacher tutor gets quickly familiar with the group to be instructed.
- Students are quicker to raise issues that occupy their minds, such as earlier difficulties with studies.
- Guidance becomes more personal.
- Teacher tutors find students to be more courageous.
- Certain fences have fallen as regards, e.g. vocational subjects and study skill guidance. Guidance is a part of everyday teaching.
- The teacher tutor and an instructor (for example, PBL) are one and the same person, with a lot of time for guidance alongside teaching.
- If a student group has a task that they cannot solve alone, the students can work on it together with the instructor during time reserved for a 'practice business' or PBL work, even if it is not a directly assigned task.
- Collaboration also spreads to other courses, assignments get done, and students feel that they receive guidance at exactly the right time. Furthermore, students are better able to focus on their assignments after moments like this.
- Cost-effectiveness.



How can teacher tutoring be developed?

## 2.4 How to study mathematics at university: a guide for students

*Meri Kailanto*, Tampere University of Technology

Studying mathematics at a university is different than studying it at an upper secondary school. It may come as a surprise to a student that succeeding in studies is not as easy as previously. Various study methods are needed in order to learn. The nature of mathematics at a university is different, as the starting point is to try and understand issues on a deeper level. A long break in calculation routines may also cause extra headache. Finding the best and most productive working methods requires some effort from the student, but it is worth the trouble. People are different in terms of their characteristics and prior skills. What works for one person may not work for someone else.

In the Tampere University of Technology Mathematics Department, the student guide ‘How to study mathematics in a university’ was created under the OTE project. It explores the nature of mathematics studies and provides tips for various ways of learning. The guide also discusses the support forms offered by TUT and presents excerpts from support material available elsewhere. The guide is available at (in Finnish): <http://wiki.tut.fi/MatoOpas>.

### Current or prospective teachers:

- Make use of the guidebook and get to know students' viewpoints.
- Give tips on the guidebook to your students.
- Think about whether the tips could be applied to studying your own subject.

Tell your students about the guidebook. Think about whether the tips could be applied to studying your own subject.



### 1. Identifying oneself as a math

**learner** – It is important for a student to identify what kind of a math learner she is. Some learn best alone, whilst others need a group to discuss problematic parts. Some want to learn everything, whilst for others, passing the course is enough. A teacher's learning style may also be different from a student's, and the tips provided may not help in that particular case.

### 2. Ensuring adequate background information–

Mathematics is a subject that accumulates, i.e. old information lays the foundation for new information. It is recommended that background information be revised in order to enable learning new.

### 3. Activating prior information and combining it with

**new** – Due to the accumulative nature of mathematics, it is also important to activate prior knowledge to form the basis for new information. After this, a new issue can be processed in various ways: by thinking back, combining and describing; and one can learn to use it in practice by applying, receiving feedback and support as well as through diagnosing one's own mistakes.

### 4. Responsibility for one's own learning –

At university, responsibility and freedom go hand-in-hand. Everyone is responsible for taking care of their own matters. The same applies to math studies. The implemented teaching strategies may or may not suit one's own learning style. Students must bravely make decisions they feel will support their own learning and sort out challenging issues with the teaching staff and fellow students.

### 5. Seeking motivation –

Motivation has great influence on learning, the amount of work one is willing to put in and the progress of studies. Students should make it clear to themselves what carries them through mathematics studies:



are they willing to truly understand the topics, pass courses, get good marks etc., and what is required of them in order to attain these goals?

**6. Use of natural language** – In mathematics, there are a number of formal ways to express things “in math.” Many may find it difficult to understand them and work with them. Students should therefore also aim to think in their own mother tongues, i.e. to make it clear to themselves what the real meanings behind the formulas are. This so-called ‘linguaging’ also makes it easier for a teacher to identify problems and the reasons behind them. This way, mental patterns can be corrected, which in turn facilitates learning new things.

**7. Learning from erroneous answers** –

Erroneous answers can be taken into good use in learning, just like examples of correctly calculated solutions. Sometimes it may feel tough to a student to hear their erroneous solution discussed publicly in class, whilst analysing someone else’s errors may feel more sensible. Once students see that others make mistakes, too, their own fear of failure diminishes. On the other hand, students also learn to justify mathematical topics and arguments when finding, explaining and correcting mistakes made by others.

**8. Learning in a group is a rational choice for many**

– Studying in a group may help if studying alone does not seem to produce results. It may also deepen learning, even if a student has learnt the actual topic alone. In a group, it is possible to apply various methods to study together or simply make calculations, so that everyone calculates independently but with help close at hand whenever needed. If a student comes to a dead end, someone else may have already overcome that stage, and vice-versa.



Which parts of the instructions apply to studying your own subject? What else should be taken into account?

## 2.5 Mathematics Clinic

*Jussi Kangas, Tampere University of Technology*

In the technical field, mathematics plays a significant role in university studies. However, many students often find mathematics courses to be challenging and burdensome. In the technical field, compulsory mathematics studies may cause problems both to freshmen and advanced students.

The Mathematics Clinic offers support in mathematics studies to all students who need it. The operations of the clinic focus mainly on supporting students who struggle with the basic courses in mathematics, but the clinic also welcomes students who have problems with more advanced mathematics studies. Students are not exactly referred to the Mathematics Clinic. Participation is perfectly voluntary and students can decide on their possible participation independently after hearing about it in lectures and through email lists.

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### **Mathematics Clinic at Tampere University of Technology (TUT) 2010–2011:**

- Approx. 40–50 weekly participants.
- 6–10 weekly small groups.
- Each small group meeting lasts for two hours.
- The instructor has been a researcher from the TUT Department of Mathematics who specializes in exploring the development of mathematics education.
- Due to the nature of the Mathematics Clinic, personality should also be taken into account when selecting instructors.
- The most important characteristics of an instructor include mathematical competence, pedagogic skills and sociability.
- The small groups have held most meetings in the Mathematics Department's own premises, but some sessions have also been organised in student cafés, for example.

The operations of the Mathematics Clinic is based on peer guidance in small group meetings once a week. Each small group contains 5–10 students on the same course and an instructor, whose main responsibilities are to encourage open discussion among students and offer them help and assistance. The aim is to create an encouraging and positive atmosphere which allows the student to obtain positive experiences of learning mathematics and consequently improve the student's motivation.

In small groups, the main attention has been given to unravelling calculation exercises included in the passing requirements of mathematics courses. The students can solve exercises together and help each other, and ask for help from the instructor when they come to a dead end. In addition to performing calculation exercises, small group work involves revising the basics of upper secondary school mathematics and discussing the issues covered during lectures.



*“It feels a lot more practical when working in a group. Everyone knows something, and it is also good to have that other person backing you up who is sure to know everything.”*

*“The instructor can be encouraging. They won’t tell you the answer straight away, but they also don’t leave you stuck with something. If you really feel like you’re unable to find a solution, they try to lead you onwards.”*

The Mathematics Clinic aims to bring mathematics closer to students. By using everyday language, even the difficult issues discussed in lectures can be explained in a way that makes it easier for students to grasp the problems and their solutions.



*“In lectures, things are sort of left like ‘do this’, but you just don’t understand what to do. In the clinic, things sort of go step-by-step.”*

*“The instructor is able to give the sort of examples that help you finally find the solution. I mean, you finally realise what they’re after.”*

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In a study [1] carried out in 2009, it was stated that the Mathematics Clinic had a positive effect on student performance. During the Engineering Mathematics II course organised in autumn 2009, 31 students joined the Mathematics Clinic who had not participated in the activities during the Engineering Mathematics I course. The average mark of these students from the first exam of the Engineering Mathematics I course was 1.58, and the percentage of passing marks was 55. The average mark of other students taking the exam was 1.97 and the percentage of passing marks was 63. With regard to the first exam of the Engineering Mathematics II course, the average mark of students who joined the Mathematics Clinic was 3.36, and only one of the students received 0. In this exam, the average mark of other students was 3.06 and the percentage of passing marks was 89.8. In other words, the setout level was poorer among the students who joined the Mathematics Clinic, but the small group activities helped them achieve higher marks than the rest of the students, based on the average marks and share of passing marks.

The students themselves stated that attending the Mathematics Clinic had improved their mathematical skills and helped them complete math courses. In a study carried out in 2009, 62% of respondents found that their attitudes towards mathematics had also become more positive during small group work.



*“I probably would have failed the first course otherwise. And if I had failed, I’m not sure I would’ve had enough motivation to continue at all.”*

Purpose of the Mathematics Clinic is to support students in their mathematics studies. The small groups aim to provide assistance with any and all problems arising in math studies. An open atmosphere encourages students to ask questions whenever something occupies their minds. The most important principle of the Mathematics Clinic is: “There are no stupid questions”.

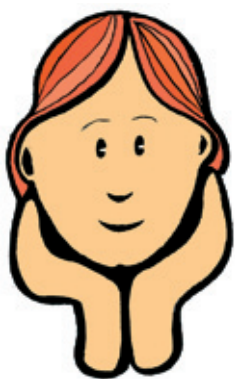


*“Studying mathematics has been a lot more sensible.. You can’t wait to get to the Clinic to finish the assignments.”*

*“I feel like I understand the issues, you know. I always did what I was taught, but the difference with the Clinic is that now I understand the issues.”*

### **The benefits of the Mathematics Clinic:**

- Students feel they have increased their mathematical competence. Improved confidence makes students try harder.
- Students have more positive attitudes towards studying mathematics and find it more sensible than before.
- The Mathematics Clinic has been found to have a positive effect on student performance.



How could you apply the principles of the Mathematics Clinic in your own classroom?  
How could you implement small group work in a large classroom setting?

### Reference

- [1] Rautiainen, E. Oppimista tukeva pienryhmätoiminta matematiikassa. Master's thesis. Tampere University of Technology. Mathematics Department. 2010.

## 2.6 Mathematics teaching experiments at Aalto University

*Pekka Alestalo, Harri Hakula, Linda Havola, Helle Majander, Antti Rasila and Jarno Talponen, Aalto University*

In the following, some active learning methods experimented in Aalto University mathematics courses are presented. The experiments have taken place in 2010 and 2011 in two separate courses.

On small courses with less than 40 students, central methods include activating lectures, peer assessment and group work. The group studies almost all first-year courses together, which increased its team spirit. During lectures, students were activated through short exercises and discussions, for example. Homework was revised through peer assessment: the students swapped their solutions and reviewed each other's assignments, based on the solutions presented on the board. In addition to homework, the course involved group assignments. The groups were given similar assignments that they needed to solve and write their answers on large pieces of paper. The answers were then reviewed on presentation walks.

In another course with nearly 300 students, the experiments were carried out in a single calculation exercise group of approx. 15 people. The group gathered for two hours twice a week. The activating methods were applied in the latter meeting of each week, instructed by the course assistant, together with an aide. This group experimented on group work, presentation walks, languaging and peer assessment. The assignments that the students had solved as homework were reviewed through group work: based on the assignments, the students were divided into groups in which they reviewed the assignment. The results were presented by applying various methods: the groups explained their solutions to others by using transparencies, or they were divided into new groups and the solutions were reviewed on presentation walks. The groups also experimented on the written languaging of the solutions as well as peer assessment.

Measured through course exams, the learning results of both experiment groups were, in most cases, good. Based on student feedback, group work reduced the pressure on arithmetic tasks. The presentation walks were especially popular. In the small course, the students found peer assessment to be pleasant, and one of the reasons for this was based on receiving rapid feedback on the assignments. In the larger experiment group, the one-off peer assessment experiment was welcomed less enthusiastically, as the students had not prepared for showing their answers to each other. The lecturer of the small course, on the other hand, found the peer assessment method to be useful, as it aroused positive debate amongst the students.

The staff participating in the small course included a lecturer and an assistant, whilst in the large course there were nine assistants in addition to the lecturer, two of whom worked with the experiment group. With regard to the number of students, more staff was used in the experiments than normal, but this arrangement is not a strict requirement for applying the described methods.

More detailed descriptions of the course arrangements and preliminary results have been reported in the article Havola, Majander, Hakula, Alestalo & Rasila: 'Aktivoiviin opetusmenetelmiin perustuvat matematiikan opetuskokeilut Aalto-yliopistossa,' to be published in the TRIM Research Report of the Interactive Technology in Education 2011 conference (Tuovi 9) during 2011.

Further information on the methods applied, such as the presentation walks, is available in the Handbook for teachers [1] pages 34–55.





Which methods can be best combined with the learning objective of your course?

Which methods can be best applied to activate your own students?

### Source

[1] Hyppönen, O. & Lindén, S. Handbook for teachers – course structures, teaching methods and assessment. Publications of the Teaching and Learning Development Unit of the Helsinki University of Technology 5/2009. Available at <http://lib.tkk.fi/Reports/2009/isbn9789526030357.pdf>.





## 3 Individual paths

## 3.1 Flexible study opportunities

*Heidi Passila*, Lappeenranta University of Technology and *Kari Manninen*, Saimaa University of Applied Sciences

Flexible studying refers to various study opportunities as well as taking situational factors and changing life situations into account. The aim with flexibility is to promote shorter graduation times and extended working careers. At the Lappeenranta University of Technology (LUT), the pursuit has involved acknowledging students' individual needs. LUT organised a workshop on flexible study opportunities at the PedaForum seminar in 2010. The participants reflected upon the kinds of needs that lead to flexibility. They felt that flexibility was needed in order to ensure that students would graduate. Also, working students and diverse learners should be taken into account in teaching.



The Lappeenranta University of Technology has applied the following solutions in order to develop flexibility:

### **Acknowledging individual learning**

- RPL Recognition of prior learning
- PSP – Personal study plan

### **Resolving challenges related to time management and location**

- Evening and weekend teaching
- Intensive weeks
- Teaching outside the university municipalities
- Making use of information and communications technology

### **Making versatile use of information and communications technology**

- Online courses
- Using video conference equipment in lecture teaching and thesis instruction
- Exam aquarium
- Online exercises and assignments
- Online peer support and guidance (home class)
- Illustrative video materials and other online study materials

## Flexible course completion methods

During the OTE project, two teachers teaching in the TUDI programme for Masters of Science (Techn.) in Industrial Engineering and Management, organised at the Lappeenranta University of Technology, have designed methods that support teaching and studying and bring flexibility to course completion options. During the course on the strategical development of production and logistics, a development project is carried out in groups and followed up by the teacher in short intervals. Providing guidance for working students living elsewhere has been a problematic issue. It is not sensible to organise guidance through weekly contact sessions, as it is unreasonable for the students to travel all the way to Lappeenranta for a 20-minute guidance session. The flexible course completion method was first tried in the spring of 2010. At that time, guidance was given by telephone and email to students who were working on the studies by themselves. However, students would learn more from the project if it were carried out in a group. In the future, the aim is to also have students living elsewhere carry out project work in groups. The Adobe Connect Pro software is used for instructing the work, and it also enables instructing the groups.

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Another example of the flexibility has been the course on 'Investment Calculation' offered in LUT's Adult Master's Degree Programmes. The problem with the course has been the students' low motivation to perform the calculations. Furthermore, there have been few calculation exercises, as the course is carried out through intensive learning. For adult learners, the course teachers have designed calculation exercises in the learning environment with the Blackboard Assessment tool. The exercises allow students to collect exam points, which has increased students' motivation to perform calculations. In the course feedback, over 70% of respondents stated that the extra points encouraged them to perform calculations.

LUT's Master's Degree Programme in Mechanical Engineering, major in Packaging Technology (ME/PT) is an international programme for Masters of Science (Techn.). Most of the students in the programme live and work outside Lappeenranta. The programme also involves students living abroad. In thesis

instruction, it has made sense to adopt distance instruction and use Adobe Connect Pro software as an aid. As for maturity tests, the students have been able to take them in the LUT exam aquarium any time that suits them.

At the Saimaa University of Applied Sciences, a two-period piloting course was organised in the civil and construction engineering training that involved transmitting the teacher's lectures (20h) to students via Adobe Connect Pro software. According to the teacher, the software required some practice during the first lectures, and not everything worked quite as it should have. Adobe Connect Pro cannot replace traditional contact teaching in all respects. Student communication through the chat function did increase as the course advanced, however. A total of 10–16 students were present in the course. The experiences received from this pilot were mostly positive, and they have led to the consideration of possibly expanding online teaching to other courses, especially with respect to adult students.

Table 1. A summary of flexible course completion methods.

Course	Why	How	Remarks
Strategic development of production and logistics	For working students living elsewhere	The teacher uses Adobe Connect Pro to instruct groups on their project work.	Instruction was first provided over the telephone or by email. This was possible when the students performed individual work. The assignment works better when completed in groups.
Investment calculation	Adding calculation exercises and offering extra points to improve motivation to perform calculations	The assignments are carried out by using the Blackboard Assessment tool.	The software selects the initial values at random so that everyone must complete their calculations themselves. The motivation to perform calculations increases when extra points are made available for completing exercises.

Course	Why	How	Remarks
Master's Degree Programme in Mechanical Engineering – Master's thesis/ Maturity test	Students living abroad/ elsewhere	Adobe Connect Pro application in Master's thesis instruction, exam aquarium application in completing a maturity test.	In the future, the aim is to familiarise students with using Adobe Connect Pro earlier than in connection with their Master's thesis. The number of instruction sessions varies according to individual needs.
Saimaa University of Applied Sciences  Civil and construction engineering training  Chemical engineering	Adult working students (not living in South Karelia)	The teacher gives lectures via Adobe Connect Pro, materials in Moodle.	At first, learning to use Adobe Connect Pro took the teacher time. Students got used to, e.g. communicating via the chat as the course advanced.



Which factors slow down students' learning?

What kinds of flexible study opportunities could you offer in your course to students in various life situations?



## 3.2 Tips for using Adobe Connect Pro with seminar papers

*Anne Salmela and Harri Eskelinen,*  
Lappeenranta University of Technology

Today, an increasing number of adult and foreign students study at the Lappeenranta University of Technology (LUT), in addition to degree students living in the municipality. The accessibility of Adult Master's Degree Programmes and studies offered in various municipalities has been based on intensive teaching during weekends. The operating model has been considered highly functional, but it has always necessitated that either the student or the teacher travel to the municipality where the teaching is offered and that the teaching be repeated, since the same teaching cannot be reused. A typical problem for adult students, in particular, is how to combine work with studies and how to get time off work. The trend seems to be that interest in separate programmes increases. For example, the Degree Programme in Industrial Engineering and Management launched a permanent Master's Degree Programme (TUDI) in its unit in Lahti in 2010.

As for foreign students, the problem is that they quickly return to their home countries and part of the studies may remain unfinished. Earlier, it was not possible for students to attend lectures either through live transmissions or recorded lectures, or to record their own seminar presentations. In 2010, LUT adopted the Adobe Connect Pro (ACP) web conferencing software which enables, e.g. real-time web conferences, online lecture arrangements as well as lecture and practice work recording, so that the students can also review them later. The purpose of this article is to provide tips on using ACP in teaching arrangements based on practical experience.

ACP has been linked to Shibboleth authorisation, which enables both single sign-ons and ACP use by visiting lecturers. Using the software requires an Internet connection, a headset or a conference microphone, and a webcam if wishing to include visual transmission. It is possible to share PowerPoint or PDF files, Windows application screens and image from the computer desktop via the system. The system also enables simultaneous writing in a Word file.

It is possible for the organisation to facilitate taking ACP into use by providing guidance and tools for its use. At LUT, the following practices have been found useful:



- An address for ACP support service requests, offering an ACP set for teachers and students (a laptop with ready-made installations, a headset or a conference microphone and a webcam).
- Initial introduction if needed.
- Organising regular ACP training.

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Based on the experiences received, the most important issues to be taken into account when using ACP include:

- The ACP support person can be reached easily and s/he participates actively in seminar presentation recordings.
- Familiarising oneself in advance with the ways to use ACP.
- Equipment compatibility with the ACP system.
- The compatibility of presentation materials with the ACP system.

Based on the collected student feedback (N=59), students appreciate

- the ability to rewatch lecture recordings online after the lectures (91%)
- the ability to watch lectures as real-time transmissions (81%)
- the ability to record practice work (53%).

The use of ACP will be adjusted as based on feedback received from the students.

As perceived by the teachers, the benefits of using ACP included less travelling, document sharing, and the ease of logging in and creating

a connection by using a mere URL link. Furthermore, ACP offers a more visual way to, e.g. supervise theses than a mere telephone meeting. At LUT, problematic issues have included audio breaks and corporate connection creation, as the firewall settings of some companies do not allow access to the system. The audio problem is likely to be solved during 2011, as the next software version, AC 8.0, is taken into use. The problems with corporate connections have been solved by building gateways that allow the connection to apply the https protocol.

### **Case: Machine Design for Packaging Technology**

The course ‘Machine Design for Packaging Technology’ organised as an intensive course at LUT between 2 and 9 May 2011, was carried out by applying ACP with the seminar presentations. The students represented a variety of nationalities, and most students returned to their home countries directly after the course ended.

It was decided that the seminar presentations given by the students would be recorded by using the Information Administration’s ACP set, together with the conference microphone. Based on the case example, the following were found to be pedagogically good practices:

- The teacher is able to watch the presentations afterwards.
- The teacher is able to reassess feedback already given.
- The teacher gets a chance to give feedback in retrospect.
- Students may more easily comment on the feedback they receive.
- The chain of feedback forms a cyclic structure.
- Assessment becomes fairer.
- Distance teaching can be received either in real time or afterwards.

Anticipated pitfalls included the possibility of technical problems, students’ insufficient preparedness to make the recordings consistent enough, and the double stress caused by giving the presentation and having to record it. Related preparations were made so that the students received an introduction to using the system, and they were allowed to log into the meeting room and test the user interface. Recording was also practised informally so that each group introduced themselves and the recording was watched

together afterwards. Thanks to the introduction and independent practising, the students were better prepared for the actual seminar day. Technical problems were anticipated so that the ACP main user from the Information Administration organised the recordings of the seminar presentations during the day and was present the whole time. This was found to be very useful and functional, as it is impossible to repeat 30–60-minute presentations if a recording should fail due to a technical problem or insufficient know-how. The implemented case example attests to the general level observations described above.

### **Practical tips for using Adobe Connect Pro**

- The teacher should focus on watching the student giving the presentation, not the image of the student projected on the screen via the data projector (the recorded material will be available to the teacher for later viewing).
- Students should be instructed to think of the camera as “a member of the audience” and to look at the audience and directly at camera by turns in a natural way. This way, those present in class do not feel like they are outsiders, and those participating via ACP also feel more included in the “genuine” seminar event.
- It is recommended to use, e.g. a PowerPoint version that features a pointer function, allowing the presenter to stay in front of the camera.
- As regards the microphone system, it must be ensured that the questions from the audience are recorded and are audible.
- The Flash video format should be used with the presentations.
- Careful video recording and professional directing would improve the quality of the recordings compared to using a mere webcam.



How could the amount of students participating in a course affect the benefits received from using ACP, and what limitations could it bring?

Which new abilities would it require from you to adopt ACP if you wanted to make use of it in your own courses?

### 3.3 Exam aquarium – a flexible exam arrangement method

*Anne Salmela and Heidi Passila,*  
Lappeenranta University of Technology

Under the OTE project, the Lappeenranta University of Technology (LUT) has analysed exam arrangement options which make use of electronic tools. In the survey, universities involved in the OTE project were asked what their exam aquarium practices were. Based on the survey, it can be noted that – of the universities involved in the OTE project – an exam aquarium is used in the Lappeenranta and Tampere Universities of Technology (TUT). At LUT, aquarium exams were piloted as early as 2002. In the aquarium adopted in 2005, almost 4,500 exams or maturity tests have been taken. At TUT, tests with the exam aquarium began in the autumn of 2006, and it was officially adopted in use in the spring of 2007.

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Aquarium exams are a flexible way to arrange exams. The teacher is able to set a period of time for the students, during which the exam can be taken. The students can take the exam during the exam aquarium opening hours on the day that suits them best. It is also possible to use the exam aquarium to take the maturity test – in which case there is no need to organise separate supervision. At best, aquarium exams speed up students' study advancement.

A student taking an exam in the aquarium of the Lappeenranta University of Technology does so on a computer under instruction. Exam enrolment has been made as flexible as possible. Students must enrol 30 minutes before the exam begins at the latest, and participation can be cancelled or rescheduled before the exam. The exam aquarium application allows the student to arrive 15 minutes late at the most, but the time reserved for the exam is equally diminished, as is also the case with traditional exams.

The helpdesk worker will check an examinee's identification and instruct him/her to leave muted phones and other unnecessary items out of reach. All required instructions are available in the aquarium in writing, both in Finnish and English. An English

language version is also available of the user interface of the application. Each examinee is instructed personally on using the aquarium software. The helpdesk has been positioned so that it allows a direct visual to the aquarium through a glass wall. The space also features recording surveillance cameras, and all exterior connections have been blocked. No cases of cheating have been reported.

At the Lappeenranta University of Technology, exam aquarium operations are organised by the Information Administration and library. The exam aquarium is located in the premises of students' helpdesk Origo, next to the library. The aquarium is open daily during Origo's service hours. Exams start at fixed times at 8:45 a.m. and at noon, as well as from Monday through Thursday at 3:00 p.m. during the academic terms. The exam aquarium is also open in the summer (in 2010 and 2011). Origo's helpdesk workers are in charge of exam supervision and arrangements.

At the beginning of 2011, the ownership of the exam aquarium of the Tampere University of Technology transferred from the library to the Student Services unit, which will launch active development measures on the exam aquarium in the autumn of 2011. At the moment, there are 10 computers and a surveillance camera in the exam aquarium. Students get support services from the IT Helpdesk, and teachers either by email ([tenttiakvaario@tut.fi](mailto:tenttiakvaario@tut.fi)) or over the telephone. The utilisation rate of the exam aquarium at TUT is approximately 10%. There are less users in June and August, and they slightly lower the total utilisation rate. In July, the exam aquarium is closed.

As the technical solution, both Universities apply SoftTutor (a software by the company Sordino Systems, purchased as an ASP service). One of the strengths of LUT's SoftTutor application has been its working reliability; exam cancellations have occurred very rarely due to a software server error. Aquarium exams provide the benefits that answers are legible and are saved on the aquarium application server. From there, they are archived approx. two months after their marking. In the archive, the answers stay safe and secure until manually deleted.

### **In teachers' view, the advantages of the exam aquarium include:**

- An exam aquarium provides students with flexibility with their studies.
- A teacher does not have to think back to remember if s/he prepared an exam.
- After exam profile creation, the exam is ready and active during the times specified by the teacher.
- All students get varying exams, since the software picks them at random.
- Teachers no longer get huge piles of exams to mark, as the students take exams at various times.  
Also, marking can be carried out whenever the teacher chooses to, and each exam can be marked separately.
- A large number of the questions is reviewed by automated checking and scoring.
- The problem with handwriting disappears, as the answers are typed and edited on a computer.
- Exam supervision does not need to be arranged separately.

Aquarium exams also bring new challenges to teachers. Exam preparations are arduous for teachers, but after that, the work becomes a lot easier. Creating a selection of questions that is extensive enough may take time if desiring to use other question types besides those based on essay answers. According to the teachers, the technical side of constructing exams was somewhat rigid.

The teachers also provided development suggestions for organising aquarium exams. Transferring results and scores into Excel and Oodi should be an automated option. When giving scores, the system could automatically provide an assessment table equalling 0–100 scores and give a mark. It would be useful to get the results



from the aquarium exams directly in an Excel format, for example, so that they would not need to be filled in separately for the Student Affairs Office.

The perceived strengths of the exam aquarium include students' wider freedom of choice with exam schedules. The downside, on the other hand, is that the opening hours of the aquarium set the limits for exam times. Students at LUT have provided the following feedback on the exam aquarium:



*"It facilitates time management and makes it easier to answer essay questions, in particular. I don't use a pencil that much nowadays, so I haven't been able to answer questions in other exams on paper the way I wanted to, because I have to use the eraser all the time."*

*"Taking exams seems to be easy and effortless, and you can also fit the exam in so that it suits your own schedule."*

*"It's great to see things evolving. When I was in school, we played with pine cone cows and wrote our answers on pieces of birch bark with coal. This is a good start. More exams should be provided in an electronic format."*

*"Could there also be an exam aquarium in Lahti, for example? Put as many exams on offer in the aquarium as possible, it is sure to significantly speed up graduation!"*



What added value could aquarium exams bring in your own university?

Which exams would be best suited to exam aquariums?

## Reference

Exam aquarium survey, LUT 2008–2009

## 3.4 It takes all sorts to make a university. Taking diverse learners into account in university teaching

*Sirpa Saari*, Tampere University of Technology

‘Diverse learners’ is a concept that has taken root as a definition of learners with special learning disabilities. The term ‘various learners’ is sometimes perceived as being more extensive and inclusive of different learning styles.

A university can significantly affect the study progress of diverse learners as well as their possibilities to participate in teaching. It is important to spread information on the subject, as diverse learners can easily be taken into account in teaching and guidance situations. **It is also good to keep in mind that many measures promoting accessibility benefit all students!**

At Tampere University of Technology, teachers’ awareness of accessibility issues and diverse learners has been increased under the OTE project through organising training on, e.g. dyslexia and Asperger’s syndrome, in addition to distributing materials produced in the Inclusive Higher Education (ESOK) project.

### Dyslexia

#### What should a teacher know about dyslexia?

Dyslexia is a special learning disability related to reading and writing that is in conflict with a person’s other skill level and learning ability. The occurrence rate of dyslexia varies between 3 and 15 per cent. Dyslexia refers to a different way of learning, perceiving and processing information. It is not an obstacle to academic or professional success, although it could make studying and coping at work challenging. [1, 2, 3]

Dyslexia may only manifest itself in writing, reading or reading comprehension, or it may be a combination of the said disabilities. For example, reading may be slow but writing is fluent.

Or alternatively, writing may be cumbersome and many spelling mistakes occur, but reading flows without problems. Dyslexia may occur separately or in connection with other conditions, such as hyperactivity. In adolescence and adulthood, the most typical dyslexic disabilities have to do with slowness and difficulty of reading as well as spelling mistakes. Dyslexia may not necessarily manifest itself in all subjects, and it is possible that it only occurs when the student is feeling stressed (e.g. during a busy exam season) or tired. Dyslexia may also involve difficulties with identifying the main points in a text, scanty or rambling writing, problems with learning foreign languages, and difficulties with concentration. Dyslexia often involves difficulties with perception, which may hinder mathematics studies even if reading as such is fluent. [1, 2, 4, 5]

Normally, dyslexia is detected as early as school age. However, a student may advance to the level of higher education without his/her dyslexia being diagnosed. In a university, students are expected to pick up a variety of new skills and to advance quickly, and this is when dyslexia may form an obstacle to study advancement. Unawareness of dyslexia as the cause of poor study success may also lead to dropping out.

### **Symptoms of dyslexia with adults:**

- Working seems to be slow and arduous.
- Putting answers in verbal form may be burdensome and take a lot of time.
- Structuring information into written form may be difficult.
- Insignificant words cause difficulty.
- Letters and numbers may get mixed and change places.
- When reading, lines appear to jump or move.
- Difficulties with sticking to and recording meetings.
- Handwriting may be difficult to read.
- Reading comprehension may be difficult, and reading may be slow or erroneous.
- A Finnish person with dyslexia may have difficulties with prepositions, particles and articles in foreign languages, along with spelling.
- Mathematics can be difficult.

### **How can a teacher take dyslexia into account when teaching?**

- No speaking and writing at the same time → allow the student to concentrate on a single task at a time.
- Pay attention to the layout of the text, select a font that is clear and large enough → a round, sans serif typeface such as Arial, size 12+, on colourful paper.
- Deliver the lecture materials or main points to the students in advance.
- Give the students an opportunity to record the lecture for later listening. Summarise the discussed issue at the beginning or end of the lecture.
- Assign tasks in smaller, manageable parts.
- Read the assignments, instructions and questions aloud (do not make the student read aloud).
- Use various ways to explain the same issue.
- Break down tasks and instructions into smaller steps → Illustrate various work stages visually or through demonstrations.
- Teach study techniques, skills and strategies.

### **How can a teacher take dyslexia into account in an exam situation?**

A student can present a certificate of diagnosed dyslexia to prove that s/he needs more time in an exam. Alternative course completion methods can also be negotiated together with the student.

**The following may also help a student when taking an exam:**

- A separate or undisturbed space.
- More space around seats or earplugs.
- The option of using a computer.
- Oral instructions on carrying out the task and reading the assignments to students aloud.
- Exam questions recorded on an audio tape.
- Exam questions written in a larger font than normal.
- Clear wordings in assignments and answering instructions.
- The possibility to bring along a list of formulas to the exam.
- Content-oriented performance assessment → spelling mistakes do not affect the marks.
- Flexible completion options → an oral exam / an essay / supplementing the information orally.

Please note that exam practices vary between universities: consult your own university for more information.

**Useful links:**

[www.erilaistenoppijoidenliitto.fi](http://www.erilaistenoppijoidenliitto.fi) (Finnish diverse learners' association; website in Finnish)  
[www.opioppimaan.fi](http://www.opioppimaan.fi) (in Finnish)

**Asperger's syndrome (AS)**

**What should a teacher know about Asperger's syndrome?**

Asperger's syndrome (AS) is a neurobiological condition of the central nervous system, included within the spectrum of autism. It causes problems especially with social interaction and affects the flexibility of thoughts and actions.

The occurrence rate of Asperger's syndrome is 4–6 per mille, and it is approximately four times more common in boys than girls. Asperger's syndrome was only properly identified in the 1980s, and consequently, many university students suffering from AS have escaped diagnosis. The students and their families may not recognise the underlying cause of their problems with studies

and social interaction. The intelligence level of people with Asperger's is usually normal or higher than that of average people and they may have exceptional talent in a specific area. However, people with AS may struggle with everyday tasks; they may face significant problems with social interaction, the concept of time, and coping with everyday life. AS may co-exist with other disorders or disabilities. For example, AD/HD, dyslexia and mental problems are common. [6, 7, 8]

### **Examples of Asperger-related features and problems**

- Speech is often formal and careful
- The stresses of speech may be peculiar
- Understanding speech in a concrete and literal manner
- Difficulties with social interaction
- May talk a lot and thoroughly even if the other person is not interested
- Difficulty understanding other people's expressions, gestures and emotions, etc.
- Difficulty putting oneself in another person's position
- Difficulty with forming companionships and friendships
- Mental maturity lags behind the average level in the age group
- May react abnormally to sensory stimuli
- Sensory hyper- or hyposensitivity to light, noises, smells and touch
- Lack of activity control
- Difficulties with getting started and finishing
- Struggles with the concept of time and keeping to a schedule
- Trouble with planning and problem-solving (difficulty in making decisions, setting goals, multitasking)
- Coping with everyday tasks is challenging (e.g. paying bills, caring for hygiene, getting enough rest)
- A need to maintain routines and rituals
- Narrow and intensive interests are typical
- Difficulty adapting to changes, gets easily stressed

### **Asperger's syndrome affects studying**

University studies require versatile skills and competence as well as an independent approach to studying. As students with AS lack some of the required skills and time management methods, they have difficulty staying in charge of their own actions. Since they may not be able to fully perceive the big picture and have trouble getting

started, planning work stages, scheduling and concentrating, a student with AS may not necessarily manage to plan or complete their studies independently. A student suffering from AS needs help and support with, e.g. preparing their PSP and following up on their studies, taking care of various study-related matters and writing their theses. A student with AS needs more concrete instructions and more personal guidance than other students to make consistent progress toward graduation. Social difficulties impede interaction with other people, so group and partner work as well as giving presentations may be extremely difficult for a student with AS. People with AS often have a lower stress tolerance than average people and mental problems, especially depression and anxiety, are fairly common. This naturally has an impact on the progress of their studies.



→ Offer support or refer the person to a specialist!

### How can a teacher take Asperger's syndrome into account when teaching and instructing?

- Stick to the agreed schedules and practices.
- Pay attention to clear and unambiguous communication: Say what you mean – do not merely imply.
  - Lectures, materials, exam questions, instructions.
  - Use exact and unambiguous language.
- Also explain matters that seem self-evident (may not understand sarcasm, irony and humour).
- Deliver the lecture materials in advance.
- Summarise, parse.
- Get rid of unnecessary stimuli.
- Arrange a quiet space for the guidance (shut the door, turn off telephones).
  - Noises, restlessness, movement, bright lights etc. may cause disturbance.
- Make sure that the issue is understood.
- If needed, allow for alternative completion methods for group work or presentations.
- Teach study skills, strategies and techniques.
  - For example, time and project management, goal setting.
    - Explain how a practical assignment should, for example, be planned, split into smaller tasks and completed.
    - Remind the student about schedules.
- Increase the clarity and flexibility of exam and assessment practices, as well as the number of related alternatives.

These and other tips, along with further information on taking other diverse learners into account, are available, e.g. in the publications of the Inclusive Higher Education (ESOK) project <http://esok.jyu.fi/>.

### Other useful websites:

The Finnish Association for Autism and Asperger's Syndrome  
[www.autismiliitto.fi/](http://www.autismiliitto.fi/) (in Finnish)

Autismisäätiö [www.autismisaatio.fi/en/main-page/](http://www.autismisaatio.fi/en/main-page/)

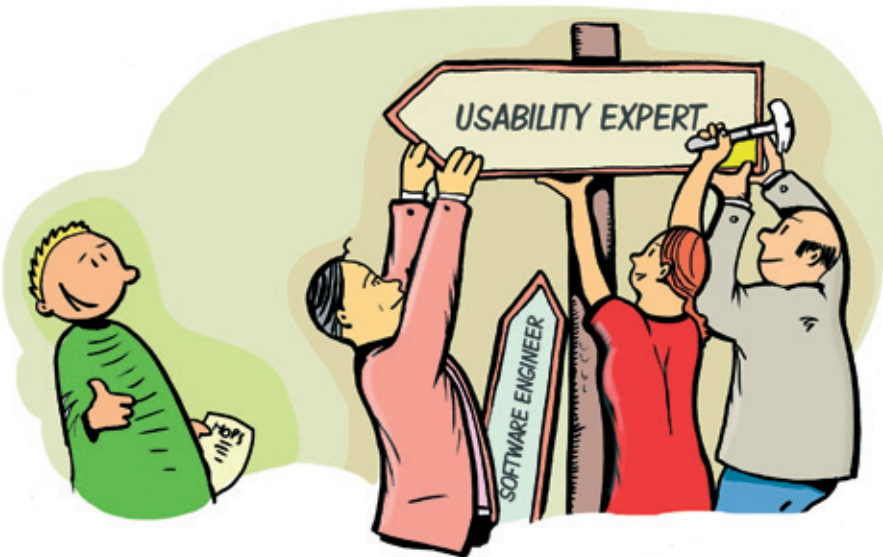


Are you aware of the kinds of support services that your university offers to students who are, for example, suffering from dyslexia?

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- [7] Nieminen, T., Kulomäki, T., Ulander, R. & von Wendt, L. Aspergerin oireyhtymä. Finnish Medical Journal 9 (55): pp. 967–972. 2009.
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## 4 Along the study path

## 4.1 Team meeting as a forum for communal expertise

*Pasi Lankinen, Helsinki Metropolia University of Applied Sciences*

Cooperation is powerful: it helps attain results that an employee may be unable to reach alone. Little by little, cooperation between teachers has become a central strategy for educational establishments, without which development and experiments would only be left to individual pioneers or forced projects initiated by the administration. At the same time, cooperation has become an important part of professional growth for teachers and, at its best, it manifests itself through the development of communal expertise in a learning organisation.

In most cases, problems with the development of communal expertise have been due to the traditional perception of the teacher's profession as an individual activity. A teacher's competence is often perceived as individual even when working together. Everyone has his/her own expertise which they "own" and do not necessarily share with others for mutual use. Further need for cooperation is also brought in by the fact that the new competence-based curricula inevitably lead to perceiving degree programmes as an entity instead of single, unrelated courses. Cooperation helps create a mutual understanding of the competence produced by the degree and makes it possible to agree how these pursued skills are developed and at which stage of studies. [1, 2]

A central element of communal expertise work is discussion. In the Degree in Media Technology at the Helsinki Metropolia University of Applied Sciences, team meetings have taken root as a forum for discussion and expertise sharing. This practice got started as early as the late 1990s. The procedure is a tested and tried method of sharing teachers' and teaching support staff's expertise, in order to make it available to the whole degree programme.

During the academic year, meetings are basically held every other Friday from 9 a.m. till noon from the beginning of September to the end of May. In other words, a total of 16–17 meetings are held every

academic year. In order to find mutual time, the meetings have been marked to the timetables (or work calendars) of the whole staff of the Media Technology Degree Programme. There are approx. 20 participants. The positions of the chairperson and secretary are rotated; they are always agreed upon for the whole academic year at the first meeting of the autumn. Memos are published in the degree programme workspace on Metropolia's intranet. Each chairperson asks all participants for items for the agenda by email a few days before the meeting, then compiles the list and brings it to the meeting. Most topics naturally come from the Head of Degree Programme, but other people also invariably suggest discussion topics. Lighter topics also go with the territory, such as illustrated travelogues and celebrations on special days.

Both current issues and long-term plans are thus discussed, along with various procedures and practices. For example, in the last couple of meetings in spring 2011, the focus was on curricula and structural renewals. The key asset of this team has been that the people involved in teaching and related support services meet each other regularly, get to know each other, and create a good team spirit within the degree programme. It has also been found important to get together outside the premises of the official organisation. This method facilitates mutual working and enables quick reactions to acute problems. Developed and tested for years, these good practices have encouraged participants to continue.

Based on experience, one of the advantages of this procedure is that there is very little, if any, bureaucracy hindering advancement. Information also flows smoothly between the parties. At one point, team meetings even almost became too informal and close to chaotic. There were no agendas or scheduled topics, and no duration had been agreed for the meeting. Nowadays, we use an agenda, and the meetings last for two hours at the maximum. The people in the degree programme still participate in team-like work surprisingly well, although the expansion of the degree programme may cause problems. As an incentive to participate, the degree programme has access to “the best snack service in the house: buns, coffee and candy from all around the world.”

As an example, the agenda and related notes for the meeting on 29 April 2011 are presented. The way that the items on the agenda are

introduced illustrates the informal nature of the proceedings and the manner of speaking used in the degree programme that may not be easily understood by an outsider.

## **May Day team, 29 April 2011**

### **May Day section**

- Petri receives a trophy, congratulations!

### **Pedagogy-administrative section**

- The last team meeting of the spring: Aarne's cottage on Wed 8 June 2011, gathering at the Neste service station in Veikkola at 8:30 a.m.
- May and June graduates: going through the list. Thesis supervisors get tough.
- Grants: two 600-euro grants from the Viestintäalan tutkimussäätiö foundation.

### **Future-visionary section**

- Working hour plans for the following academic year: check your own teaching from the working hour + implementation plans (e.g. desired classrooms) and make/communicate to Harri any changes by 2 May at 8 a.m.
- Curriculum 2012: A major structural change will only take place in 2013. For now, working on the curriculum in small groups (mobile, av, print, Internet, usability) based on the current structure. Presentations ready on 31 May 2011. Discussed at Aarne's cottage on 8 June 2011.

### **Internationality-virtual section**

- Erkki A on an inexpensive and interesting broadcasting trip in Las Vegas.
- Merja B promoting social media in Botswana.
- Pentti exploring the additional module of sustainable development in Ulm.
- Aarne puts Windows 7 on a remote Mac into good use in a virtual cloud on an iPad.

The team meeting practice is threatened by the excessive expansion of the organisation, i.e. the degree programme. For example, it seems that a team meeting of over 20 people does not work in an ideal manner. In these cases, it may easily happen that some people basically do not talk at all during the year. A team that is too large may also result in the whole group never being present at the same time, and information consequently does not reach everyone. When the number of participants exceeds 25, it is likely that subgroups must be formed and meetings including all participants held less frequently – perhaps once a month.

Such an interaction model as a team meeting is probably not a rare or otherwise unconventional form of mutual activity. When used in a wide sense and at its best, it may add to the cohesion of the teaching and other staff within the entire organisation, especially if it does not involve the juxtaposition of the people working in various educational fields or degree programmes. One potential problem is that “professional excellence” takes over in like-minded small groups without anyone questioning it or presenting critical viewpoints. Development work may form cliques of several different operating models, unless the organisation realises what is happening in the various parts of the work community. There is a limit to everything, but great resources reside in limitations that are overcome. [2]



Which measures could be applied in your work community to get people involved in planning mutual matters?

How to motivate people to participate, even those who usually do not?

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## 4.2 Learning outcomes

*Suvi Jutila, Aimo Rahkonen and Petra Rutanen,*  
University of Oulu

Learning outcomes are goal descriptions which briefly explain, from a student's point of view, what a student is expected to master at the end of a course or module in order to pass it. Intended learning outcomes are clearly and simply expressed sentences which describe a student's competence, are easy to assess, and clearly indicate the competence level. Learning outcomes should be prepared in a way that enables a student to attain them during the concerned course. Quality teaching is compacted in well-defined learning outcomes.

At <http://www.uef.fi/w5w/julkaisut>, you can find instructions for preparing learning outcomes:

- How to install learning outcomes in your curriculum  
– advanced syllabus
- How to install learning outcomes in your curriculum  
– basic syllabus

How to get the best benefits from learning outcomes and what are they? To get the best possible benefits from learning outcomes, teachers should assess the attainment of learning outcomes and build their teaching based on competence. Assessment often steers a student's time management and competence build-up. In order to ensure the quality of degrees, it is important from the management's point of view to base curricula upon competence and to make learning outcomes assessment functional in degree programmes. The following benefit map presents various viewpoints to benefits that can be attained when the learning outcomes are a genuine part of the curriculum and its implementation.

Table 1. Benefit map of intended learning outcomes

Students	Teachers/ advisors	Education management	Working life/other interest groups
Able to assess the attractiveness of courses and their applicability in the attainment of one's own competence and career goals.	Enables planning constructively aligned teaching (the goal and purpose of the education become clearer).	With learning outcomes, it is possible to make degree programmes transparent and target-oriented. Learning outcomes help ensure the constructive alignment of a degree programme.	Makes the competence produced by the education visible to employers, other education providers and interest groups.
Help and support a student with self-assessment and peer assessment during studies.	Makes the assessment of learning and guidance more competence-based and thus better ensures that the students are competent.	May identify possible overlaps and deficiencies in the entities formed by individual courses (major subjects and modules).	Help applying and referring to supplementary trainings (lifelong learning).
Maintain students' motivation and encourage them to target-oriented learning.	Teachers are able to make informed decisions on learning materials as well as teaching and assessment methods.	Able to assess the correspondence between courses and make decisions on their accreditations.	It is easier for employers to provide feedback on the correspondence between education and working life, aiming to develop the education. ▶

Students	Teachers/ advisors	Education management	Working life/ other interest groups
Able to assess their own professional development and explain their competence when applying to work.	Preparing learning outcomes necessitates identifying the core substance of the course from the viewpoint of competence.	Preparing learning outcomes necessitates identifying the core substance of degrees and study entities from the viewpoint of competence.	Employers, various education producers and interest groups are able to focus their recruitment measures on experts and professionals with the competence they need.
Facilitates the recognition of a student's prior learning in other institutes of higher education both in Finland and elsewhere (RPL).	Able to assess the correspondence between courses and make decisions on their accreditations.	Learning outcomes communicate the quality of education and enable its "branding."	Promotes the assessment of a university from a quality-based viewpoint (AHELO and KKA, The Finnish Higher Education Evaluation Council Finlandia)



## Assessing the quality of learning outcomes



*“Intended learning outcomes are clearly and simply expressed sentences which describe a student’s competence, are easy to assess, and clearly indicate the competence level”.*

In order to attain the benefits of learning outcomes, the quality of learning outcomes must be assessed in terms of constructive aligning and the assessment and level of competence. The learning outcome analysis and form below are useful tools for, e.g. a designer who instructs teachers with preparing learning outcomes. With the learning outcome analysis, it is possible for anyone to assess the quality of the intended learning outcomes. A learning outcome analysis template is attached to this publication (Appendix 5).

### Learning outcome analysis

Using the tool has been illustrated with a fictional example. The fictional learning outcome has been assessed and analysed with the form and questions for contemplation. Each sentence in a learning outcome description should be analysed by following the same principle as in the example. Typically, using 3–5 learning outcomes per course is recommended.

Diagram 1. Learning outcome analysis

CURRICULUM - CONSTRUCTIVE ALIGNMENT

Learning outcome: After completing the course, a student will know how to use the basic tools of modelling software, especially to create structural views.				
The verb – does it describe competence (from a student's point of view)?	What kind of competence? (related to knowledge/ skills/ attitudes/...)	Which level of competence?*	How does a student show his/ her competence? (assessment methods)	How and where to learn/teach/ instruct? Time resources?
Yes, the verb structure utilised, “will know how to use”, clearly describes a student's competence.	The learning outcome primarily describes skill-related competence.	The learning outcome mainly refers to applying a learned skill/ information.  In Bloom's taxonomy, the learning is positioned in the middle level of application.	By completing a practical work with basic tools.  The teacher assess the practice work based on assessment criteria, and other students conduct peer assessment with the help of assessment exercises.	The teachers provide instructions to get the work started (2h) and schedule instruction sessions (3 x 1h). The actual learning takes place with the group (40h).
<p>Contemplation:</p> <ul style="list-style-type: none"><li>Is the learning outcome in line with the curriculum?</li><li>Are the verbs of the learning outcome clear in terms of the competence level? (Do the teacher and students have the same conception of the competence level? The use of such words as “understands,” “knows,” “is familiar with” or “masters” is not recommended, as the competence level and assessment viewpoints are not made clear enough).</li><li>Do the assessment and teaching methods support the attainment of competence?</li></ul> <p>The planned assessment and teaching methods are in line with the goals and support the attainment of the learning outcomes. No learning outcomes have been prepared for the degree, but in the light of learning outcomes prepared by other teachers, the development and cumulation of competence seems to be in order. The competence level is made clear and verbs have been used that are easy to assess in accordance with Bloom’s taxonomy.</p> <p>Assessing competence with a traditional exam would not measure the competence in accordance with the concerned learning outcome reliably enough. Application, for example, cannot be measured with a traditional exam in this case. It is difficult to measure the skills of creating something new and application-based with an exam of this kind.</p>				
<p>* Competence level can be assessed with, e.g. various taxonomies: Cognitive competence: <a href="http://www.coun.uvic.ca/learning/exams/blooms-taxonomy.html">http://www.coun.uvic.ca/learning/exams/blooms-taxonomy.html</a> Cognitive, affective and psychomotor competence: <a href="http://www.uwsp.edu/education/lwilson/curric/newtaxonomy.htm">http://www.uwsp.edu/education/lwilson/curric/newtaxonomy.htm</a></p>				

The educational manager should enable cooperation between the teachers and peer feedback provision on the learning outcomes when working on the curriculum. The continuous development of learning outcomes is possible if a teacher takes students' feedback on the learning outcomes and their attainment into account. Feedback from the working life and other reference groups on both learning outcomes and the competence of graduates helps further develop learning outcomes.



Pair up with a colleague and assess the learning outcomes of your courses together by applying the learning outcome analysis.

Is there anything to improve in the learning outcome descriptions?

## 4.3 Co-operative learning

Kimmo Kyttä and Janne Koljonen, University of Vaasa

*“Biologists say that humans are social animals for whom it is a characteristic feature to seek company from other people and to operate in groups. -- With this background in mind, it actually seems odd that learning at school has traditionally concentrated so strongly on individual study”. [1]*

Today, with a large share of people working in service professions or expert positions, it is important to not only know your field but also to be able to work in cooperation with other people. The advantage of co-operative learning is based on a few interconnected issues. First of all, it leads students to teaching each other (peer learning). Consequently, they must process what they have learned, and this teaching becomes more personal than the teaching that teachers usually have time to provide. Furthermore, co-operative learning coaches students to use operating models that they can apply in working life, along with the actual course contents. Students' learning motivation is better maintained than when listening passively to lectures or in traditional group work. Co-operative learning is based on work processes that are designed to minimise the problems encountered with traditional group work. The worst of these problems is the so-called 'free rider problem.'

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*“The poster idea was also great. It demonstrated the very benefit of working in groups: you could do your own part and ask for advice from others when needed. We explored the posters in the next lecture, and learning was also easy, since the teaching came from other students”. (A student)*

**The realisation of the prerequisites for co-operative learning can be assessed through a so-called PIES analysis.**

**The teaching must fulfil the following prerequisites:**

- Positive interdependence (P):
  - learning objectives can only be attained if everyone else attains them, too (a positive objective dependency)
  - group members are rewarded for the group's outcome, or the knowledge that other students receive from the outcome (a positive reward dependency)
  - the various members of the group have different educational materials available for use (a positive resource dependency) and the group members
  - occupy roles that complement each other – such as the reader, note-taker and reviewer (a positive role dependency).
- Individual accountability (I):  
in addition to group assessment, each student is also subjected to individual assessment.
- Equal participation (E):  
the structure of the group work ensures that everyone has to participate in the work, e.g. the group members have to complete different tasks from one stage of the work to another.
- Simultaneous interaction (S):  
students must communicate with each other in groups, which allows several people to talk at the same time.

## **The implementation and benefits of co-operative learning**



*"Perhaps the most positive thing about the course has been the exercises that sort-of deviate from the normal. Instead of normal independent working, the work is done in groups, and in my opinion this facilitates learning, and it is easy to ask others in the group about things you do not know".*

(A student)

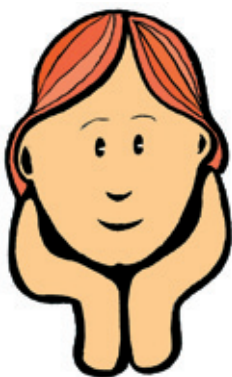
One example of implemented co-operative learning is the Signal Processing course at the University of Vaasa. The course participants are divided into pairs, and both members of the pair are given their own home assignments to be completed before the exercise class (**P, I, E**). In the exercise class, the pairs reassemble, combine their knowledge, and start to draft a poster on the topic (**P, E, S**). Two pairs are combined to form a group of four, which prepares the poster (**P, S**). Self-assessment is conducted on the group work. In the next lecture, the completed work is analysed and discussed on a guided presentation walk; the participants are divided into four presentation groups – one member of each exercise group joins each presentation group. Each presentation group familiarises itself with each poster so that a member of each exercise group presents the contents of his/her own poster to the other members of the presentation group (**P, I, E, S**). After the tour, the teacher presides over the discussion on the poster topics, asking questions and also providing corrections, supplementary information and summaries as well as providing feedback. Students' learning is assessed with a micro exam (**I**) (see Continuous assessment, p. 102). In addition, work is assessed separately after each stage, i.e. the students get scores for their individual, partner and group work (**P**).

It is important to give independent assignments to every student before forming groups. This way, they cannot avoid familiarising themselves with the topics. Also, rewarding independent efforts with scores before moving on to partner and group work stages (and receiving related rewards) motivates students to complete their own assignments. The teacher must comment on completed work and provide additional information on the topic in order to avoid disregarding something essential. At this point, it is also useful to have a mutual discussion on the topics of the work with all course participants before moving on to the next subject areas.

The topics of the assignments should be planned so that the topics of the final groups somewhat overlap with each other. This sheds light on various viewpoints to the same subjects. Furthermore, the groups should always be divided differently when assigning topics. If students group with people they know, it is more likely that the students who know the subject best do most of the work, and the benefits of co-operative learning do not materialise. Groups should contain students with both stronger and poorer study success,

however. As the learning process proceeds, more advanced students help others fill gaps in their understanding. At the same time, they also learn more themselves by structuring their own knowledge. If continuous assessment is also applied in a course applying co-operative learning, it is easy to divide students into groups of various internal levels by making use of score statistics.

At the University of Vaasa, the biggest perceived challenges in the implementation of co-operative learning have been the assessment of time management needs, the numeric assessment of the learning process, and instructing the learning in a way that gets the students started with their work right away.



Think back to your own studentship. What kinds of group work did you find interesting and sensible, and which were more of a nuisance for you?

How could you encourage students to discuss study topics together?

#### Source

- [1] Viitasalo, Timo. Yhteistoiminnallinen oppiminen ja osallistava kasvatus. PS-kustannus, 2006.

## 4.4 Continuous assessment

*Kimmo Kyttä and Janne Koljonen, University of Vaasa*

Students often have a bad habit of leaving their studies – such as reading for an exam or completing exercises – to the last minute, which causes degradation in the quality of learning. Panicky studying for an exam on the previous evening and writing this temporary information down in an exam often leads to forgetting most covered issues soon after the exam. The true advantage that the student gains from the course therefore remains quite limited. Continuous assessment is one way of preventing this problem.

### What is continuous assessment?



*“The old-school method of a single exam could be compared to an eating disorder: the information is stuffed in on the previous evening before the exam and then thrown up, so to speak, on a piece of paper on the exam day”.*

(A student)

In continuous assessment, part of the mark or even all of it is based on frequent partial performances and possibly an assessment of the learning process. One example of this is the exercises and so-called micro exams. The micro exams are substantially smaller in scope than actual exams, and they could be completed on a weekly basis, for example. By testing students' knowledge frequently, their studying will divide more evenly for the duration of the entire course. In case topics discussed during previous lectures are included in micro exams, it also tests how well the learning is retained. The main advantage of continuous assessment is the guidance of students' time management. If a course involves many micro exams, students cannot leave their studying to the last minute; instead, studies divide more evenly for the duration of the entire course. The issues covered are retained more easily, and the lighter workload prior to the exam period will also facilitate the completion of other courses. In addition, the teacher receives real-time information on how well the students have digested the



covered issues. In the traditional final exam model, the worst case scenario is that the teacher only finds out at the end of the course that s/he has failed to teach certain issues or has given them too little attention. Continuous assessment ensures even feedback provision on the students' learning. This way, it is even possible for a teacher to react to any learning-related problems arising in the middle of the course. Furthermore, the scores received by students in micro exams will help them get motivated.

Quick micro exam marking with a low loading level can be attained by using multiple-choice questions. However, this makes it more difficult to test deep knowledge. Marking open-ended or especially essay questions on a weekly basis or almost weekly is, nonetheless, an arduous process – and one may not have the resources to do it. In mass courses, it is quite a challenge to implement continuous assessment – especially with open-ended questions. On smaller courses with a few dozen students, on the other hand, it is an effective way to motivate students and guide them with time management. In mass courses, they could be used together with automatic marking by using a system in which the marking and scoring of exams have been automated.

The implementation of continuous assessment is not without problems. Some of the students react to the procedure with strong critique, especially at the beginning. When micro exams are based on multiple-choice questions, it is challenging to prepare the questions in a manner that leads towards understanding connections and principles – instead of superficial learning. When students are absent, a retake needs to be prepared, resulting in a higher number of exams for the teachers to mark. There is also a risk of short-term learning by heart, which is why the questions should relate to material covered earlier.

Table 2. Benefits and limitations

Benefits	Limitations
<ul style="list-style-type: none"><li>• Students' time management guidance</li><li>• Continuous feedback on the fluency of studies both for the teacher and the students</li><li>• Motivates the student with an even flow of feedback and rewards</li><li>• Gives the teacher an opportunity to react to learning problems even in the middle of the course</li><li>• Reduces students' workload prior to the exam period</li><li>• Very well-suited for joint use with co-operative learning (see Co-operative learning, p. 98)</li></ul>	<ul style="list-style-type: none"><li>• Feedback on the learning process must be quickly given to students</li><li>• With micro exams, it is challenging to select the question types and to produce the questions quickly enough</li><li>• Implementation is challenging on mass courses</li><li>• Could cause a negative reaction in students</li><li>• The necessity to arrange retakes</li><li>• A risk of short-term learning by heart, needs to contain references to previously covered topics</li><li>• Challenging to combine with flexible studies</li></ul>

### The implementation of continuous assessment

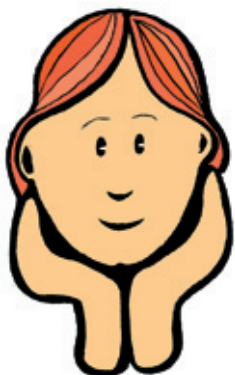
It is important to keep the cumulated scores from micro exams easily available and to quickly update it. The best method to do this is to use the course's own website. The scores should be updated right after marking the micro exams. This way, the system motivates the students as effectively as possible. Especially towards the end of the course, those who have had poor success add their effort if they are close to a passing score. This also allows students to get quick feedback on their competence level as the course proceeds.

Micro exams can be incorporated by linking the previous micro exam to homework exercises. This way, students can themselves patch up deficiencies they have found in their knowledge and skills – and get rewarded for these efforts through scores given for exercises. When homework is discussed in class, students are not left uninformed about the correct answers.

Continuous assessment is especially well-suited for bottleneck courses, as it forces students to work throughout the duration of the course. If many teachers get excited about it at the same time, someone needs to coordinate their timing to avoid several micro exams taking place on the same day.

### **Other methods of continuous assessment**

- A learning diary/portfolio, including self-assessment and reflection. Kept throughout the course. The teacher gives scores and provides written feedback often enough.
- The assessment and feedback of the intermediate reports of course work.
- Automated exam or exercise marking – an electronic system that is able to mark the assignments automatically. Moodle, for example, contains versatile options.
- The potential of electronic teaching platforms (discussion boards, blogs, process writing in a group etc.), into which peer- and self-assessment can also be linked.
- Essays and other written assignments on a regular basis.
- Participatory assessment in interactive guidance situations: the teacher and student mutually assess learning in verbal interaction.



How to plan a course completion model in a way that allows the completion of the course to form an unbroken, continuous learning entity instead of disconnected sections?

How would you plan micro exam questions or exercises that measure deep learning instead of trivia, without adding too much to the students' or teachers' workload?

### **Additional information**

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## 5 At the end of the study path

## 5.1 Take a test to see what kind of a thesis instructor you are!

*Heidi Passila, Lappeenranta University of Technology*

### **When a student begins his/her work...**

- a) I find a thesis worker position and title for the student, as it would surely take a lot of time for the student to find them him/herself.
- b) I go through the plan on the content and schedule of the work together with the student.
- c) I wait for the student to bring the first version of the completed thesis for me to read.

### **I instruct the student...**

- a) on a daily basis in order to ensure that the work finds its right course.
- b) during the agreed meetings and, e.g. by email if needed.
- c) when I have time from my other tasks. Usually, the meetings are useless. Students do not make any advance preparations for them.

### **The most important thing for a supervisor is to...**

- a) make sure that the student does nothing wrong.
- b) reflect upon his/her own courses of action and to constantly develop as a supervisor. The work is challenging as the students vary.
- c) review the completed thesis and get the student to graduate.

### **Students receive feedback on their work...**

- a) constantly. They need encouragement to carry on!
- b) in the agreed meetings. Constructive feedback helps students make corrections to their work.
- c) once it is finished. There is no point reading theses midstream.

### **When a student disagrees with me...**

- a) I emphasise my own experience in that specific field of study.
- b) I discuss the issue with him/her and also hear his/her point of view and justifications.
- c) I do not have the time for such prattling. If students want

good marks, they should do as I say.

### As regards employer company...

- a) it is good to meet regularly so that they gain insight on what the thesis should be like.
- b) it is good to sign an agreement on the thesis so that everyone understands each other's goals related to the thesis.
- c) a university supervisor does not need to have discussions.  
The student is in contact with the company.

### Results



#### The most 'a' answers:

You seem to have a lot of time for supervising a student. You may be even overly committed to supervising thesis work. This causes a risk of the thesis not becoming the student's own work. The student's independence suffers. Who is it pursuing a good mark: you or the student?



#### The most 'b' answers:

You are a responsible supervisor. You understand that you need to support the student as early on as defining the thesis title. You nonetheless give space to the students for performing their work, and you provide instructions during the agreed sessions and whenever needed. Do you also share your successful supervising experiences and tips with your colleagues?



#### The most 'c' answers:

You find a student to be autonomous enough to complete their own thesis. However, you leave the student unassisted as early as the very beginning of the work. You seem to be very busy with work and lack motivation for supervising. Have you noticed that supervising students is also part of your work duties?

## 5.2 Developing thesis instruction

*Katja Laurinolli, Aalto University*

Good guidance practices spread in interaction with other instructors. Common guidance rules can help provide equal guidance to all students. Well-adopted and explicit thesis process instruction helps the tasks of both the thesis author and the university. This chapter focuses on the sharing of thesis instruction practices through various exercises within one's own work community. They could be implemented as part of the programme on development day. The exercises help supervisors recall the current state of their instruction, the challenges and successes of their instruction, and to think up new ideas.

### **Wine and chocolate – a structured pair interview exercise**

The wine–chocolate method is a visually structuring guidance method developed by Anna Raija Nummenmaa and Liisa Lautamatti [1]. The method is based on ready-made questions that can be used to chart the progress and obstacles of a work process. The set of questions for supervisors called “What is your current situation with student guidance?” will display the current state of guidance and give the supervisor an opportunity to listen to him/herself, reflect upon his/her work, and be heard without interpretations and advisory comments. The exercise can be used to gather guidance experiences for a mutual discussion and identify prevailing guidance-related challenges in the organisation for future development.



**The stages of the exercise:**

1. Form pairs, preferably with people who are not your closest colleagues. The idea is to enable richer sharing of guidance experiences and to open new points of view.
2. The exercise is given to the participants on paper. In turns, both play the role of an interviewer and an interviewee. The interviewer proceeds with the questions from top to bottom, listens to the interviewee and writes down the interviewee’s thoughts in the order that s/he expresses them. The interviewers may specify the general questions as needed, but they must avoid steering the interviewees and interpreting their speech.
3. Reflecting: After the interview, the interviewer reflects the interviewee’s comments on their current state of student guidance by repeating the comments as the interviewer heard it.
4. Change of roles.

Table 1. Benefits and exercise duration

Benefits	Exercise duration
<ul style="list-style-type: none"><li>• activates discussion</li><li>• an opportunity to equal participation</li><li>• subjective experiences</li><li>• bringing out the challenges of instruction</li><li>• the best practices of instruction</li><li>• suitable for application in groups of various sizes</li><li>• works every time!</li></ul>	<ul style="list-style-type: none"><li>• 30 min for the pair interview</li><li>• The overall duration of the exercise depends on the size of the group and the level of detail on which the results of the exercise are analysed.</li></ul> <p>One good practice is to discuss the results of the interview in pairs from the interviewer's point of view, with both explaining each other's situation.</p>

## What is your current situation with student guidance?

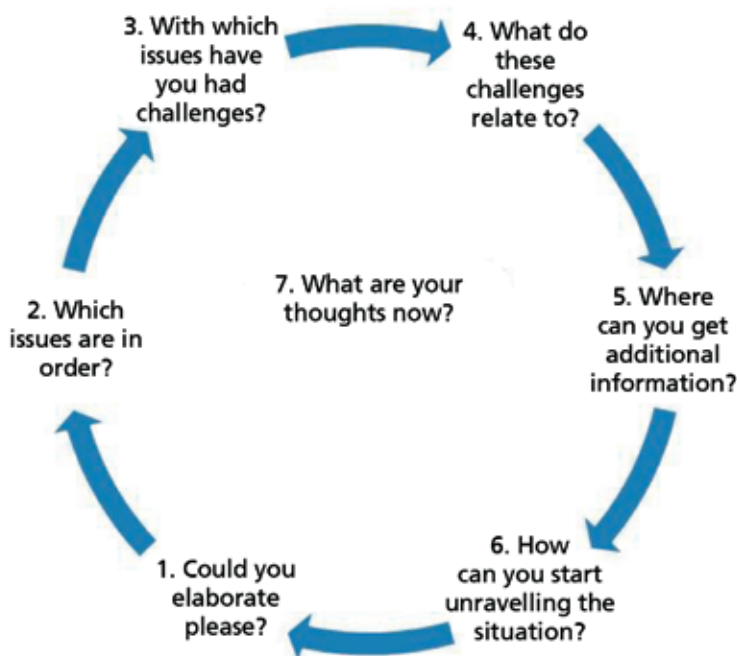


Figure1. What is your current situation with student guidance?

**In the workshops of the OTE project, the following guidance-related challenges have arisen:**

- Scientific writing and related guidance
- Students' passiveness or excessive activeness
- Assessment challenges
- What is an adequate amount of instruction? Familiarise yourself with the fourfold table on sufficient instruction on the next page.

### **Note!**

The exercise also provides practice to having thesis feedback discussions with students. Read more on reflecting, instructional feedback and feedback that is also assessing [1, pp. 91–97] (In Finnish).

## The ‘Fourfold table of sufficient instruction’ exercise

Instructors are often puzzled about the sufficient amount of instruction. The topic has also been covered in the workshops and training sessions of the OTE project. The instruction resources and the supervisor’s working plan determine the amount of time available for the instruction. For both the student and the instructor, an agreement on what sufficient instruction is and how it is implemented is an issue related to the protection of rights. The involvement of a student, in turn, is determined by a dialogue of autonomy and responsibility in the thesis process.

The current state of guidance can be discussed in a structured manner with the help of the “Fourfold table of sufficient instruction” exercise. The exercise is carried out in small groups, and it is good to include a facilitator in each group to steer the conversation and take notes. It can be especially recommended that the exercise be carried out internally within an educational unit; this allows quickly moving on to brainstorming development measures in the participants’ own organisation. To read results from earlier workshop discussions, see the project publication on thesis instruction [2] (in Finnish).

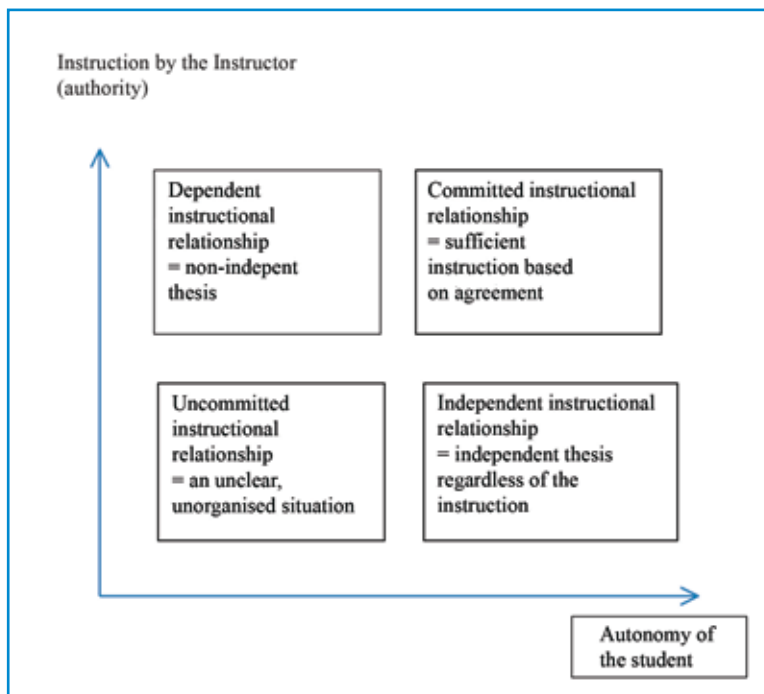


Figure 2: The fourfold table of instructional relationship

Discuss the prerequisites for good instruction in groups, making use of your own supervising experiences. Reflect on the factors of a fluent thesis process and the various hindrances related to theses. In addition to the point of view of instruction relations, think up solution proposals to the problematic issues from the points of view of working life, the university, and support services.

### **1. Uncommitted instructional relationship**

The supervisor and/or student may have motivational problems. The student may have many other ongoing projects in life that steal time from the thesis. There may also be hindrances that impede the thesis from getting started when a student lacks a thesis title and job. The supervisor may be burdened due to scanty supervisory resources.

- 1) How to speed up thesis start-up?
- 2) What kinds of methods could there be for completing delayed tasks?
- 3) How can the process be made fluent?
- 4) How should the instructors' ability to give guidance be developed?
- 5) How should the instructional practices in the companies?

### **2. Dependent instructional relationship**

The supervisor uses too much resources on the instruction. The student is passive or seeks support. This causes the risk of a non-independent thesis.

- 1) Do you have experiences in excessive instruction?
- 2) How can this situation come about?
- 3) Solution proposals?

### **3. Independent instructional relationship**

The student is autonomous and writes the thesis regardless of the instruction. The supervisor is passive or the student does not allow room for instruction.

- 1) An ideal thesis author?
- 2) Does the situation involve problems? What kinds?
- 3) Which reasons can lead to such a instruction relationship?

#### 4. Committed instructional relationship

Both the supervisor and the student are responsible and committed to the instruction process. The rules of the instruction have been agreed upon, and expectations about the instruction are realistic.

- 1) Why is it that good instruction does not always materialise?
- 2) What kinds of experiences do you have on successful instructional relationships?
- 3) What are good instructional practices in companies?

The purpose of the exercise is to allow participants to share their thoughts and their own development work with others interested in the topic.



Reflect upon your own experiences with instruction. In particular, think back on an instruction situation you regarded as successful. Describe that occasion as concretely as possible – what was the initial situation like, what happened, what made that particular instance of instruction successful, etc. Share your experiences!

#### References

- [1] Nummenmaa, A. R. & Lautamatti, L. Ohjaajana opinnäytetöiden työprosesseissa. Ryhmäohjauksen käytäntöä ja teoriaa. Tampere: Tampere University Press. 2004.
- [2] Laurinolli, K. (ed.) Jaa ohjausta, vai? Opinnäytetyön ohjauksen käytäntöjä tekniikan alan yliopistoissa ja ammattikorkeakouluissa. Aalto University publication series. Science + Technology 2/2011. Available at: <http://lib.tkk.fi/TIEDE TEKNOLOGIA/2011/isbn9789526040240.pdf>.

## 5.3 Instruction – yes, please!

*Pasi Lankinen*, Helsinki Metropolia University of Applied Sciences

The publication “Jaa ohjausta, vai? Opinnäytetyön ohjauksen käytäntöjä tekniikan alan yliopistoissa ja ammattikorkeakouluissa” (= ‘Sharing instructions. The practices of thesis instruction in the universities and universities of applied sciences of the technical field.’) [1], prepared in the OTE project, has been taken seriously at the Information and Communication Technology cluster of the Helsinki Metropolia University of Applied Sciences. Discussed in the publication, the problematic issues, practices and experiments related to thesis instruction in the field have inspired Metropolians to prepare a development and action plan for an instructed thesis process. The purpose is to adopt the plan in the autumn of 2011 – a mere 6 months after the publication came out.

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Methods tested and tried elsewhere have been found to broaden the approach to thesis instruction and provide worthy ideas to also developing operations in the one’s own university. Since the publication “Jaa ohjausta, vai?” especially highlights aspects related to theses in the technical field, it supports the thesis process development work in one’s own university more efficiently than the works covering all fields of study.

Gathered into the publication, students’ experiences on the pressure and hopes related to the thesis stage offer general guidelines for the reassessment of instruction. Also, the thread of the thesis process gains further strength: a thesis is an independent process, but the important role of a supervisor must not be forgotten. A student should not be left alone; the process must be instructed and coordinated, and the progress of the thesis should be followed up.

Based on student feedback, the worst perceived hindrances to the thesis stage have been

- going to work whilst studying
- other projects in one’s personal life
- an occasional lack of motivation with working on the thesis.

Students have found the following to be the most important targets for development:

- the cooperation and distribution of responsibilities between working life representatives and the university
- instructions on thesis instruction
- spreading tried and tested practices.

According to the teaching staff's experience at the University of Applied Sciences, improvement in writing skills also represents a method to promote the progress of thesis processes.

### **Instructed Master's thesis process**

The purpose of an instructed Master's thesis process is to make the process firmer and more coordinated than currently. As the foundation for the action proposals for honing the process, development targets were selected both from among those highlighted in the OTE project and those detected in the university's own operations. The work therefore “merely” required exploring existing materials – nothing new had to be invented as such.

What comes next is more challenging. Taking the principles of an instructed Master's thesis process into practice requires commitment from both the supervisors and students, mutual planning of practical actions and keeping each other informed about these actions. In order for the activities to succeed, both parties involved must also stick to the agreed practices and procedures. The practices applied in degree programmes vary, and one of the purposes of an instructed Master's thesis process is also to standardise instruction in an appropriate manner. Conformity also increases students' opportunities for equal treatment in terms of instruction.

Two months after the publication “Jaa ohjausta, vai?” came out, a full set of detailed individual action proposals was completed at the Information and Communication Technology cluster of Metropolia. The set contains seven sub-areas: For each of the following sub-areas, 4-7 action proposals have been gathered to

support the Master's thesis process. The plan is to start applying these proposals in practice as soon as possible:

1. Developing the cooperation between working life representatives and the university
2. Coaching writing skills as a part of curriculum-based intended learning outcomes
3. Making a start on the Master's thesis in good time
4. Following up on the progress of the Master's thesis
5. Committing oneself to the instruction of the Master's thesis
6. Sharing information on good instruction practices to others
7. Collecting feedback on the Master's thesis process

Each university reacts to the results of the OTE project in their own way and at their own pace, and makes use of them by applying them to their prior practices. At other universities, an instructed Master's thesis process may also comprise various sub-areas than the ones mentioned above. In Metropolia, the challenges and doubts often raised in thesis-related discussions have been answered in a very concrete manner: "Instruction – yes, please!"



How are good instruction practices shared in your work community? Or does "to each his own" apply?

What concrete actions could be taken to share good practices?

## Reference

- [1] Laurinolli, K. (ed.) Jaa ohjausta, vai? Opinnäytetyön ohjauksen käytäntöjä tekniikan alan yliopistoissa ja ammattikorkeakouluissa. Aalto University publication series. Science + Technology 2/2011. Available at: <http://lib.tkk.fi/TIEDE TEKNOLOGIA/2011/isbn9789526040240.pdf>.



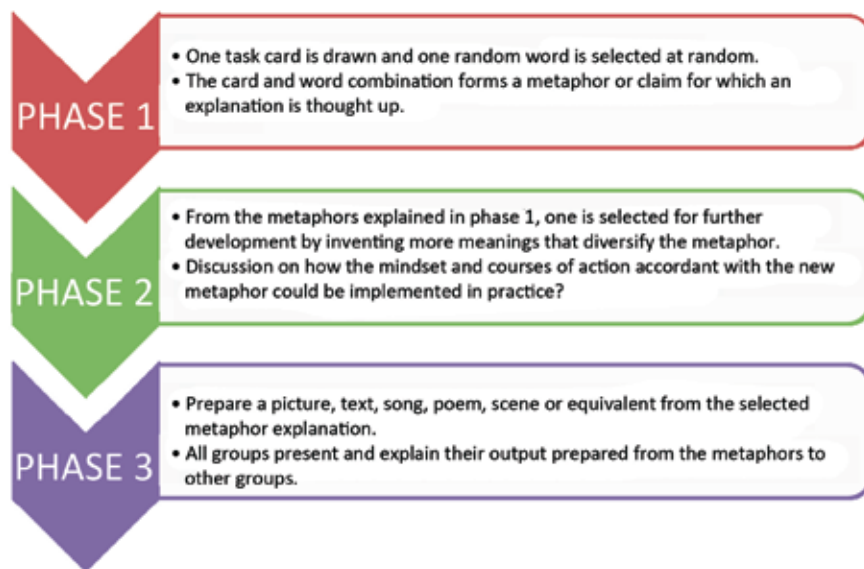


## 6 Study Path Game

## Study path game

During his or her study path, a student may encounter many kinds of factors that delay studies. Going to work while studying, poor study skills, a lack of motivation or starting a family may lead to studies being delayed or even coming to a full stop. The study path game aims to help solve problems related to study path fluency by innovating new approaches to study paths through combining random ideas. The game is suited both to students and teachers, and several versions of it are available for use.

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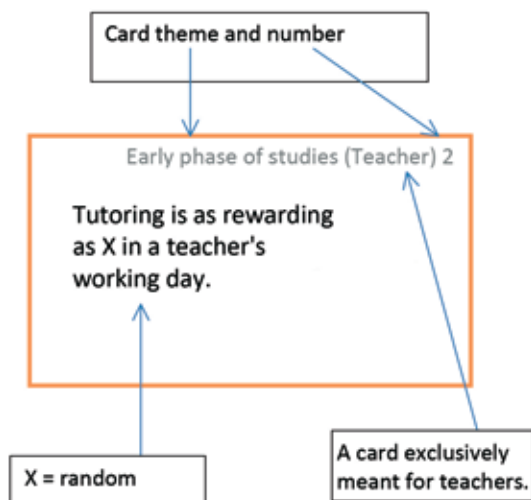


The study path game is at its best as a discussion opener and as a tool for brainstorming. In this game, there are no correct or incorrect answers, and everyone has an equal opportunity to participate. Try playing a round – the study path game is fun!

The game includes the following materials:

**Task cards (appendix 6):**

1. Early phases of study, 12 task cards
2. Study skills, 11 task cards
3. Learning outcomes, 4 task cards
4. On the study path, 13 task cards
5. Final phases of study, 10 task cards



**Random word cards (appendix 7)**

A random word is selected by rolling the dice or by selecting a number between 1 and 6. After this, a random word card is drawn and the random word corresponding with the number is looked up. On each explanation round, a new task card and a new random word card is used. The word cards can be used several times during the game by selecting some other word among the six options than the ones already used.



## Game duration

### Phase 1: 30 min

Explaining one task card + a random word takes about five minutes (in groups of three). In a bigger group, prepare for a longer time.

If the aim is to explain one card from each theme (a total of five cards), it is recommended that approx. 20–30 min be reserved. Quick players can explain more cards.

### Phase 2: 10–15 min

The purpose of the phase is to further develop one metaphor. Also discuss how the mindset and courses of action accordant with the new metaphor could be implemented in practice.

### Phase 3: 20–30 min

Prepare a picture, text, song, poem, scene or equivalent from the selected metaphor, and use it to explain the idea behind the metaphor to others. Remember to reserve any materials that the groups may need for preparing their outputs.

### The end of the game

All groups present their output prepared from the metaphors to other groups. The presentations should take approximately 5 min per group.

## Game versions

### 1<sup>st</sup> version: Playing all study path themes

- The game involves five study path-related themes. The players play 1–2 rounds so that one task card + a random word is drawn from each theme (a total of 5–10 task cards + random word combinations).
- The game helps players perceive the study path in a versatile manner.

### 2<sup>nd</sup> version: Playing a selected theme

- In this version, it is possible to focus on a specific

subject, such as the early phases of study or, for example, task cards related to graduation.

**3<sup>rd</sup> version: The same task card for everyone + a different random word**

- This version facilitates understanding the meaning of random words and remembering the metaphors, as all groups deal with the same subject. In this version, it is interesting to see which issues repeat in the different metaphors and what kinds of new meanings different words add to the subject.
- This can be used as an aid to discuss a specific subject together.
- This version can be implemented quickly, for example, to get oriented to the subject or to brainstorm.

**4<sup>th</sup> version: The same random word + a different task card**

**5<sup>th</sup> version: To students**

- As an advisor's tool in the various phases of a study path
- Themes: study technique, thesis, tutoring

**6<sup>th</sup> version: The game instructor has various means to affect the way the game is played.**

- The instructor may select specific task cards for the game and leave others out.
- The instructor may distribute either different or the same cards to all groups to be used in the game.
- The number of random words can be limited or the cards can be selected.
- The instructor may modify the cards to better suit his or her own purposes.
- The instructor may invent new task cards.
- The instructor may determine how the metaphors are unraveled.
- Metaphoric ideas can be developed after the game with an exercise in which a solution is sought to a specific practical problem.



## Appendices

- APPENDIX 1 Exercise in pairs: Why have they lost their motivation?
- APPENDIX 2 Exercise in pairs: The “value bell” of study skills
- APPENDIX 3 Group exercise: Study skill hindrance/promotion through teaching
- APPENDIX 4 Time management follow-up sheet
- APPENDIX 5 Learning outcome analysis
- APPENDIX 6 Task cards of the study path game
- APPENDIX 7 Random word cards of the study path game

## APPENDIX 1 Exercise in pairs: Why have they lost their motivation?

### Exercise in pairs: Why have they lost their motivation?

**Analysing possible causes of students' motivational problems:**

1. Each pair / group of three familiarises themselves with a student (Ellen, Craig, Carol, Adam, Ian) and discusses what the causes of motivational problems could be
2. Each pair “introduces” their own student
3. Mutual discussion on how each student could be helped to improve their motivation

#### **Ellen Example**

is an 'A' pupil from comprehensive and secondary school. She started her studies at TUT with great enthusiasm, as she had always excelled in mathematics and physics. For the first mathematics course, Ellen got 2 as a mark, and now she has lost all interest...

#### **Craig Carpenter**

has enjoyed working with his hands ever since he was small. He has been able to disassemble and reassemble tube radios since he was nine and has dreamt about becoming an engineer ever since. After the first year of studies, however, he has started to hesitate.

#### **Carol Cancer-Researcher**

has applied to med school three times already. In addition to reading the entrance exam books, she has studied at TUT for a few years. Carol is not interested in becoming a health centre physician; rather, she is interested in cancer research.

#### **Adam Asperger**

is a meticulous and conscientious student who demands a lot from himself. He got through the autumn term of the first study year after a fashion – but in the spring, he seemed to be running out of hours of the day. He does find the topics interesting, but it is somehow difficult to concentrate...

#### **Ian Iffy**

is quite unsure about what to do with his life. Ian does not feel especially gifted with anything, and he usually gets his share of bad luck as well: exams never include the questions he studied for, and his studies are bogging down. Ian has dropped out of a number of courses after the first midterm exam.



## APPENDIX 2 Exercise in pairs: The “value watch” of study skills

## Exercise in pairs: The "value watch" of study skills

1. Parsing study skills into five groups:
  - Organisation and coordination skills
  - Social and performance skills
  - Research and information acquisition skills
  - Skills in logical thinking and expression
  - Self-reflection skills
2. Forming pairs and grouping study skills into order of priority with the value watch analysis
3. The pairs present their orders to others
4. Mutual discussion on the importance and significance of the skills – noticing that there may be a lot of variation in the orders (concluding that discussion is most essential in the exercise, not the outcome)

### The value watch of study skills

#### Using the value watch:

1. Draw an arrow from one item to another with the arrowhead pointing at the more important item
2. Run through all pairs
3. Count the arrows pointing at each item
4. Arrange into order (the most important = the most arrowheads)



## APPENDIX 3 Group exercise: The hindrance/promotion of study skills through teaching

### Group exercise: The hindrance/promotion of study skills through teaching

Discussion on teachers' opportunities to affect motivation and skills

1. Dividing into three groups
2. From their own points of view (curriculum communication, lecture teaching, assessment and grading), each group reflects upon the measures that a teacher may take to hinder/promote the development of motivation and study skills
3. Gathering the observations to PowerPoint on the go
4. Mutual discussion on the most likely pitfalls for a teacher

An example table for gathering the outcome from group work.  
Note! Prepare separate tables for each group/point of view.

A teacher may...	Promote	Hinder
The development of motivation		
The development of study skills		

Real-time timetable													
Name:													
time	Mon	study method	Tue	study method	Wed	study method	Thu	study method	Fri	study method	week:		study method
	Sat		Sun										
7:00-8:00													
8:00-9:00													
9:00-10:00													
10:00-11:00													
11:00-12:00													
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14:00-15:00													
15:00-16:00													
16:00-17:00													
17:00-18:00													
18:00-19:00													
19:00-20:00													
20-21													
21-22													
22-23													
23-24													
24:00-01:00													
My study goal this week:													



## APPENDIX 5 Learning outcome analysis

Learning outcome analysis					
CURRICULUM – CONSTRUCTIVE ALIGNMENT	The verb – does it describe competence (from a student's point of view)?	What kind of competence? (related to knowledge/skills/attitudes/...)	Which level of competence?	How does a student demonstrate his or her competence (assessment methods)?	How and where to learn/teach/instruct? time resources?
Contemplation: <ul style="list-style-type: none"> <li>Is the learning outcome in line with the curriculum as well as the assessment and teaching methods?</li> <li>Are the verbs of the learning outcome clear in terms of competence level? (Do the teacher and students have the same conception of the competence level? It is not recommended to use words such as “understands,” “knows,” “is familiar with” or “masters,” as the competence level and assessment viewpoints are not made clear enough).</li> <li>Do the assessment and teaching methods support the attainment of competence?</li> </ul>					

## APPENDIX 6 Task cards of the study path game

Cut out the task cards beginning on the following page. Do the same with the random word cards in Appendix 7. To make the cards more durable, glue them on cardboard.

## Appendix 6 1(5)

Early phase of studies 1

**At the beginning of studies, a student's expectations meet X.**

Early phase of studies (Teacher) 2

**Tutoring is as rewarding as X in a teacher's working day.**

Early phase of studies 3

**With tutoring, X is essential.**

Early phase of studies 4

**The problem is that a student sees his or her career opportunities as X at the beginning of studies.**

Early phase of studies 5

**Mathematics can be like X in a student's backpack.**

Early phase of studies 6

**On mass courses, X-type students learn best.**

Early phase of studies 7

**A teacher makes learning mathematics meaningful with X.**

Early phase of studies (Teacher) 8

**Being a teacher in a basic course is rewarding like X.**

Early phase of studies 9

**The difficulty of mathematics to students could be compared to X.**

Early phase of studies 10

**When planning an example timetable, X should be taken into account.**





## Appendix 6 2(5)

Early phase of studies (Teacher) 11

**Teachers find early-phase students to be like X.**

Early phase of studies 12

**X is a problem that threatens the starting of studies.**

Learning outcomes 1

**A learning outcome is like X.**

Learning outcomes (Teacher) 2

**When formulating intended learning outcomes, it is recommended that X be taken into account.**

Learning outcomes (Teacher) 3

**Teachers' attitudes towards learning outcomes are a problem, and they therefore act like X.**

Learning outcomes (Teacher) 4

**Assessing learning outcomes is like X.**

Study skills 1

**Study skills are like X.**

Study skills (Teacher) 2

**It is possible to encourage the acquisition of new information with the X method.**

Study skills 3

**Study skills are put to test due to X.**

Study skills 4

**When trying to memorise something, X helps.**



## Appendix 6 3(5)

<p>Study skills 5</p> <p><b>Study skill development manifests itself in X.</b></p>	<p>Study skills 6</p> <p><b>Writing in a university is like X in a bookshelf.</b></p>
<p>Study skills 7</p> <p><b>Students' professional identities are like X in the pocket.</b></p>	<p>Study skills 8</p> <p><b>The X method may ease performance anxiety.</b></p>
<p>Study skills 9</p> <p><b>The obstacles to studies and learning are like X to students.</b></p>	<p>Study skills 10</p> <p><b>A student's time is like X.</b></p>
<p>Study skills (Teacher) 11</p> <p><b>Make use of X when you want students to practice self-assessment.</b></p>	<p>On the study path 1</p> <p><b>A course that delays study advancement can be recognised by X.</b></p>
<p>On the study path 2</p> <p><b>The best method of collaborative learning is X.</b></p>	<p>On the study path (Teacher) 3</p> <p><b>I instruct students to cooperate on my courses like X.</b></p>



## Appendix 6 4(5)

<p>On the study path 4</p> <p><b>Continuous assessment is like X.</b></p>	<p>On the study path 5</p> <p><b>When instructing students' time management, I use X as my resource.</b></p>
<p>On the study path 6</p> <p><b>Peer assessment is like X.</b></p>	<p>On the study path (Teacher) 7</p> <p><b>When developing study materials, I use the X method.</b></p>
<p>On the study path 8</p> <p><b>Flexibility for a working student is as important as X</b></p>	<p>On the study path 9</p> <p><b>Online instructing is like X.</b></p>
<p>On the study path (Teacher) 10</p> <p><b>Flexible teaching methods are like X to a teacher.</b></p>	<p>On the study path 11</p> <p><b>Distance teaching should be arranged like it was X.</b></p>
<p>On the study path 12</p> <p><b>Lecture halls are not needed in teaching, as they are like X.</b></p>	<p>On the study path 13</p> <p><b>Working students are like X.</b></p>



## Appendix 6 5(5)

Final phase of studies 1

**The main idea of a thesis instruction agreement is X.**

Final phase of studies (Teacher) 2

**X makes thesis instruction more fun.**

Final phase of studies 3

**At the end of the study path looms X.**

Final phase of studies (Teacher) 4

**I do not know how to supervise a thesis, as my instruction methods are like X.**

Final phase of studies 5

**The thesis is delayed due to X.**

Final phase of studies (Teacher) 6

**My instruction practices resemble X.**

Final phase of studies 7

**When a thesis is delayed, it is the supervisor's duty to be like X.**

Final phase of studies 8

**When working on a thesis, students' peer support is like X.**

Final phase of studies (Teacher) 9

**In thesis instruction, a student's time management can be facilitated with the X method.**

Final phase of studies (Teacher) 10

**Supervisors' collegial support to each other is like X.**





## APPENDIX 7 Random word cards of the study path game 1(3)

1 Staple	1 Saw	1 Hospital	1 Dog
2 Chewing gum	2 Paddle	2 Messenger	2 Zoo
3 Bush	3 Necklace	3 Bullet	3 Bowl
4 Donkey	4 Fireworks	4 Sole	4 Fungal growth
5 Hunting	5 Loom	5 Radiator	5 Clay
6 Wolf	6 Microphone	6 Sheet	6 Stadium
1 Eyeglasses	1 Ladder	1 Anchor	1 Fire
2 Kitchen	2 Carpet	2 Pie	2 Crown
3 Mill	3 Chain	3 Rug	3 Concrete
4 Ferry	4 Sunset	4 Barrel	4 Radar
5 Railroad	5 Hanger	5 Crab	5 Bee
6 Leaf	6 Sparkle	6 Souvenir	6 Ant
1 Bus stop	1 Slide	1 Piano	1 Fireplace
2 Photograph	2 Ghost	2 Escalator	2 Farm
3 Pigeon	3 Soldier	3 Parachute	3 Tennis
4 Dinner	4 Star	4 Flag	4 Wrench
5 Dragon	5 Skyscraper	5 Mattress	5 Balcony
6 Scarf	6 Algae	6 Onion	6 Brick



## Appendix 7 2(3)

1 Spider	1 Ventilator	1 Gear	1 Statue
2 Playground	2 Sunglasses	2 Chisel	2 Republic
3 Step	3 Pancake	3 Gate	3 Toothbrush
4 Jogging path	4 Laser	4 Rain	4 Grasshopper
5 Salad	5 Café	5 Panther	5 Kite
6 Octopus	6 Swing	6 Desert	6 Rocking chair
1 Sausage	1 Graffiti	1 Chandelier	1 Stove
2 Pillar	2 Cave	2 Rhythm	2 Concert
3 Tourist	3 Cat	3 Microscope	3 Duck
4 Chewing gum	4 Garden	4 Gallery	4 Frog
5 Shopping centre	5 Marble	5 Football	5 River
6 Bait	6 Magician	6 Music	6 Dock
1 Cabbage	1 Chapel	1 Skirt	1 Stool
2 Envelope	2 Spiral	2 Turtle	2 Razor
3 Horn	3 Monkey	3 Ladybird	3 Game
4 Cruiser	4 Cannon	4 False teeth	4 Pipe
5 Hinge	5 Briefcase	5 Ash	5 Mast
6 Courier	6 Pirate	6 Island	6 Grove



## Appendix 7 3(3)

1 Quarry	1 Spotlight	1 Shopping trolley	1 Paper clip
2 Chicken	2 Travelling	2 Hostage	2 Table
3 Toothpick	3 Brake	3 Choir	3 Tide
4 Police	4 Satellite	4 Elk	4 Kangaroo
5 Parliament	5 Riot	5 Bear	5 Fleet
6 Kiosk	6 Bird	6 Map	6 Banana
1 Horseshoe	1 Runway	1 Cow	1 Porcelain
2 Bridge	2 Sunrise	2 Band	2 Tent
3 Motel	3 Loudspeaker	3 Theatre	3 Trapeze
4 Jelly	4 Chameleon	4 Ostrich	4 Bath
5 Wine	5 Thunder	5 Crane	5 Sleigh
6 Stamp	6 Puppy	6 Flea	6 Paradise
1 Elevator	1 Haystack	1 Dynamo	1 Horse
2 Snow	2 Cloud	2 Blonde	2 Window
3 Purse	3 Teddy bear	3 Walking stick	3 Fish
4 Padlock	4 Scar	4 Gas	4 Roulette
5 Egg	5 Mask	5 Screwdriver	5 Receipt
6 Forest	6 Hoe	6 Cocktail	6 Fencing





OTE is a joint national project in the technical field (2008–2011) in which various teaching development actions are taken to find solutions that facilitate study path fluency. Study Path Guide – Tips to teaching in the various phases of studies is the final publication of the project, meant as a workbook for teachers, advisors and teaching developers. Illustrated, illustrative and practical, the publication contains a lot of exercises and detailed descriptions of the practices that make study paths more fluent, developed in ten institutes of higher education. The guidebook advances from the beginning of the study path to the very end, and enables creating individual paths. One of the fundamental themes in the guidebook is collaboration, which can be practised in the study path game that combines all themes. Study Path Guide paves the way for developing study paths and finding the best practices.



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